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ABBREVIATIONS

EPA	Environmental Protection Agency
GAO	General Accounting Office
ORD	Office of Research and Development

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REPORT BY THE

Comptroller General

OF THE UNITED STATES

COMPLETED ORIGINAL

Promising Changes Improve EPA's Extramural Research; More Changes Needed

The Environmental Protection Agency's annual research and development appropriations for fiscal years 1978-80 averaged $336 million, about 70 percent of which has been spent on research conducted under contracts, grants, and cooperative agreements. Congressional hearings, external studies, and EPA's own studies have shown that EPA was not receiving the sound scientific information it needs.

In the last few years, EPA has changed its research process to correct most of the weaknesses identified. However, unless more is done, EPA may still not receive the quality of research it needs.

GAO recommends, among other things, that EPA:

- Require regulatory offices and laboratories to agree before projects are started that the approach and timing are reasonable to meet intended needs.
- Obtain peer review of research strategies.
- Improve project officers' ability to monitor extramural research.
- Complete research contract awards quicker.
- Evaluate contractors and grantees to minimize repeat awards to unsatisfactory researchers.

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A

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-200458

The Honorable Jerome A. Ambro
Chairman, Subcommittee on Natural
  Resources and Environment
Committee on Science and Technology
House of Representatives

The Honorable John C. Culver
Chairman, Subcommittee on
  Resource Protection
Committee on Environment and
  Public Works
United States Senate

As requested in your January 29, 1979, letter and in accordance with subsequent discussions with your offices, we reviewed the Environmental Protection Agency's extramural research program.

This report shows that the Agency has made relatively recent changes that have the potential for improving the overall planning and management of the program. However, there are certain problems that could continue to hamper the Agency's ability to meet its research needs, if not corrected.

We are sending copies of this report to other congressional committees; the Director, Office of Management and Budget; and the Administrator, Environmental Protection Agency. Copies are also being sent to appropriate interested parties and copies will be available to others upon request.

Elmer B. Staats
Comptroller General
of the United States

REPORT OF THE
COMPTROLLER GENERAL

PROMISING CHANGES IMPROVE EPA'S EXTRAMURAL RESEARCH; MORE CHANGES NEEDED

DIGEST

In response to external and internal criticism, the Environmental Protection Agency (EPA) has made a number of changes to the planning and management of its research activities.

It was too early for GAO to fully assess the impact of these changes but, if properly implemented, they should improve EPA's research program. But some problems require further attention, and certain other factors and weaknesses, unless corrected, could continue to seriously hamper EPA's ability to meet its research needs. Some problems in EPA's research program are:

--Offices responsible for implementing EPA's programs do not always participate with its research office in determining the size and scope of projects, possibly resulting in research that does not meet EPA's program office needs. (See pp. 14 and 15.)

--EPA's research office has not yet fully implemented reviews of its research programs, projects, and results by experts inside and outside of EPA to determine their scientific and technical merit and validity. (See pp. 19 to 23.)

--Project offices could not adequately monitor researchers' technical progress in conducting projects outside of EPA (extramural research) because of heavy workloads and travel limitations. (See ch. 3.)

--Contracts generally take substantially longer to award than EPA's standard acquisition leadtimes, thereby unduly delaying the start of needed research. (See ch. 4.)

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--EPA lacks information on past performances of outside researchers for use in determining which applicants appear best qualified to perform new projects. (See ch. 5.)

EPA HAS NOT BEEN GETTING THE QUALITY OF RESEARCH IT NEEDS

EPA's headquarters and regional offices need sound scientific information to carry out their regulatory responsibilities mandated by numerous environmental protection acts concerned with controlling and abating pollution in the areas of air, water, solid waste, pesticides, noise, radiation, toxic substances, and energy.

(About 70 percent of EPA's annual research and development appropriations, averaging $336 million from 1978-80, have been spent on research conducted outside EPA primarily under contracts, grants, and cooperative agreements. Nearly all of the extramural research is managed by project officers at EPA's 15 laboratories scattered across the country.)

In 1976 and 1977, congressional hearings and studies by the National Academy of Sciences and the Office of Technology Assessment clearly showed that EPA was not satisfactorily fulfilling its research needs. These critics attributed this lack of success basically to:

--Inadequate coordination between EPA's research office and the offices responsible for implementing programs.

--Insufficient attention to long-term anticipatory research.

--Lack of peer review to evaluate the quality of EPA's research program, projects, and results. (See pp. 7 to 10.)

EPA has tried to improve the planning and management of its research activities. It has established 13 research committees comprised of representatives from major EPA organizational components to plan and oversee the use of more than 90 percent of the research and development budget. (See pp. 10 to 13.) It has also established an office for identifying long-term research needs and developed procedures for expanding solicitations for grant awards and review of proposals at its headquarters to encourage competition. (See pp. 16 to 19 and 51 and 52.)

GAO recommends that the EPA Administrator have the Assistant Administrator for Research and Development:

--Establish procedures that require regulatory offices and laboratories to agree before work is started that the approach and timing of research projects are reasonable to meet intended needs. (See p. 23.)

--Require research committees to obtain peer review of their multiyear strategies. (See p. 23.)

--Seek sufficient appropriations for project officers to make necessary site visits to observe extramural research and instruct laboratory directors to make sure that such visits receive high priority in the use of available travel funds. (See p. 39.)

--Train project officers to properly contract with extramural researchers and require them to complete technical evaluations of contract proposals within established time frames. (See p. 56.)

GAO also recommends ways for EPA to improve its evaluations of the performance of those who conduct extramural research for the Agency. (See p. 69.)

AGENCY COMMENTS

EPA stated that GAO's report examined legitimate past complaints about the planning and management of its extramural research program. However, it contended that it was further along with improvements than GAO's report suggests and that its progress to date warranted a stronger affirmation of the actions taken to correct deficiencies already identified in the program. (See app. II.)

Many of the actions pointed out by EPA as evidence of further progress occurred after GAO's field work had been completed. Furthermore, GAO believes that those actions--although promising--are not material enough to affect the conclusion that it was too early to assess their impact on the program.

EPA acknowledged that project officers' workloads and travel funds for site visits to their extramural projects required attention but stated that relief for neither is wholly at the discretion of EPA's management. In the past, EPA has not provided the Office of Management and Budget or the Congress with information on the specific intended use of requested travel funds. GAO believes that such information would be beneficial to these reviewers when considering EPA's need for additional travel funds for site visits. (See p. 40.)

EPA agreed that both (1) contract project officer training and (2) renewed emphasis on timely evaluation of contract proposals would be highly desirable. EPA concurred with GAO's recommendations and stated that it intended to take necessary corrective actions. It also agreed that more could be done to comply with present procedures for evaluating the performance of contractors; however, it stated that its system for evaluating grantees' performance was adequate. GAO continues to believe that EPA should establish procedures for evaluating grantees' performance at the end of each project so that it would have information for use in evaluating grantees' applications for any new awards. (See pp. 57, 70, and 72.)

CHAPTER 1

INTRODUCTION

The Environmental Protection Agency's (EPA's) mission is to protect and enhance environmental quality. To carry out this mission, EPA must understand the complex factors that contribute to environmental pollution and develop viable, systematic ways to abate and control the environmental damage they cause. EPA tries to do this by integrating research, monitoring, standard setting, and enforcement activities.

EPA's major regulatory program offices of Enforcement; Water and Waste Management; Air, Noise and Radiation; and Pesticides and Toxic Substances are responsible for developing regulations, standards, and guidelines for pollution abatement and control. These offices must rely on EPA's Office of Research and Development (ORD) for the information needed to make their regulations and standards scientifically and legally adequate. Since these offices are the major users of research results, ORD must plan with them to identify the research they need most to accomplish their objectives. Chapter 2 discusses this planning process in some detail.

Specific authority for EPA's research and development activities, including the assessment of the environmental aspects of energy development, is obtained from annual authorization and appropriations acts and virtually every major environmental protection act which EPA is responsible for implementing. Some of the major acts follow.

--Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 _et_ _seq_.).

--Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1401 _et_ _seq_.).

--Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 _et_ _seq_.).

--Clean Air Act, as amended (42 U.S.C. 7401 _et_ _seq_.).

--Noise Control Act of 1972 (42 U.S.C. 4901 _et_ _seq_.).

--Toxic Substances Control Act of 1976 (15 U.S.C. 2601 _et_ _seq_.).

--Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended (7 U.S.C. 136 _et_ _seq_.).

--Safe Drinking Water Act of 1974 (42 U.S.C. 300f *et seq.*).

The importance of research and development to EPA's mission is evident from the appropriations made for it. For the fiscal years 1978-80, EPA's annual budget averaged $6.3 billion, most of which ($5.2 billion, or 82 percent) was for grants to municipal, State, and interstate agencies to help pay for the planning, design, and construction of publicly owned wastewater treatment facilities. However, an average of 30 percent of the remainder was earmarked for research and development, as shown in the following table.

Fiscal year	Total EPA appropriations excluding construction grants	Research and development appropriation (note a)	Percent of total
	(millions)		
1978	$ 905.6	$319.5	35
1979	1,203.9	328.5	27
1980	1,260.2	361.4	29
Average	1,123.3	336.5	30

a/These amounts include funds that were not made available to ORD. For example, they include ORD's pro rata share of agency-wide support costs for a wide variety of overhead charges for such things as facilities lease costs, communications, centralized automated data processing services, and "housekeeping" costs at ORD laboratories. Accordingly, these research and development appropriations are more than the combined estimated amounts shown on page 3 as used or planned for in-house and extramural research activities for these 3 fiscal years.

FUNCTIONS OF THE OFFICE OF RESEARCH AND DEVELOPMENT

ORD is responsible for administering EPA's research and development activities to satisfy the needs of all EPA operating programs. Its role is to produce the scientific data and technical tools for (1) developing effective pollution control strategies and reasonable environmental standards, (2) preventing and abating pollution, and (3) monitoring pollution conditions.

Because ORD is headed by an assistant administrator, it is on an equal footing with EPA's major regulatory program offices. Its research program is administered primarily through 4 headquarters offices--each managed by a deputy assistant administrator--and is implemented by 15 laboratories located throughout the Nation. The responsibilities of ORD's headquarters offices and the laboratories under their direction are shown in appendix III.

MOST RESEARCH IS DONE OUTSIDE EPA

ORD scientists and engineers perform some of EPA's research at its 15 laboratories. However, inadequate laboratory space, equipment, and personnel permit only about 31 percent of the appropriations made for research to be used in-house. The remainder is used outside EPA (extramural) through grants, contracts, and agreements primarily with universities, private commercial firms, nonprofit organizations, State and local governments, and other Federal agencies. ORD's estimates of the amounts of its appropriations used or planned for in-house and extramural research in fiscal years 1978 through 1980 are shown below.

	In-house		Extramural	
Fiscal year	Millions of dollars	Percent of total	Millions of dollars	Percent of total
1978	84.8	28.1	217.0	71.9
1979	99.7	31.8	214.3	68.2
1980	108.6	32.1	229.7	67.9
Average	97.7	30.7	220.3	69.3

As expected, the number of extramural projects conducted during fiscal years 1978 and 1979 exceeded in-house projects by about the same ratio. Apparently that situation will continue in fiscal year 1980, as shown below.

Fiscal year	In-house projects	Percent of total	Extramural projects	Percent of total	Total projects
1978	574	23.4	1,874	76.6	2,448
1979	669	24.7	2,036	75.3	2,705
1980	765	24.9	2,310	75.1	3,075

An ORD scientist or engineer is assigned as a project officer to manage each extramural research project. Although the project officer is not the primary performer of the extramural research, he/she plays an important role. Some of the project officer's responsibilities include

--planning the goals, objectives, procedures, and expected outcomes of projects;

--procuring, with the assistance of contracts and/or grants specialists, an appropriate organization to do the job;

--monitoring the performer's progress and performance throughout the project; and

--reviewing the performer's work for quality and compliance with the terms of the agreement.

Many project officers are also responsible for managing in-house research; providing technical assistance to EPA regional and program offices, State and local governments, and others; and planning future research programs.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this review was to examine EPA's planning, procurement, monitoring, and evaluation of extramural research to determine if these activities were being managed in ways that would accomplish EPA's research objectives.

We were guided by concerns expressed (1) in a January 29, 1979, letter to us from Senator John C. Culver, Chairman of the Subcommittee on Resource Protection, Senate Committee on Environment and Public Works, and Congressman George E. Brown, Chairman of the Subcommittee on Natural Resources and Environment, House Committee on Science and Technology, 1/ (and subsequent agreements with the Chairmen's offices), (2) a 1977 study by the National Academy of Sciences, and (3) other sources, including congressional hearings in 1976 and 1977.

1/Congressman Jerome A. Ambro subsequently became Chairman of the House subcommittee, but Congressman Brown remained a member.

The issues we addressed were:

- --Are EPA's procedures for planning the research program adequate to identify research that is most important to support its regulatory objectives?
- --Does EPA maintain adequate oversight of contractors' and grantees' research efforts to ensure the best results?
- --Are EPA's procedures for procurement of extramural research managed so that the most capable contractors and grantees are selected in a timely manner?
- --Does EPA have procedures to adequately review ongoing and completed research to ensure that contracts and grants result in quality products?
- --Does EPA adequately evaluate the performance of contractors and grantees to minimize future awards to unsatisfactory performers?

Over the last couple of years EPA has made a number of major changes to improve management of its research activities, and some of these changes were in early stages of implementation. Therefore, we were not able to evaluate the impact they will have on the extramural research program. Consequently, our review was limited to determining the status of these changes and their prospects for accomplishing EPA's research objectives.

We conducted our review at EPA headquarters in Washington, D.C., which is responsible for environmental protection program implementation, research and development, and contracts and grants management. We visited six EPA laboratories--the Health Effects and Industrial Environmental Research Laboratories at Research Triangle Park, North Carolina; the Municipal Environmental Research and Industrial Environmental Research Laboratories at Cincinnati, Ohio; the Environmental Monitoring and Support Laboratory at Las Vegas, Nevada; and the Environmental Research Laboratory at Athens, Georgia. These six laboratories sponsored large amounts of extramural research and provided coverage of ORD's four major research areas. (See app. III.)

The laboratories at Las Vegas and Athens were selected to represent the seven EPA laboratories whose procurement is handled by a contract operations center some distance away from the laboratory site (Cincinnati). We wanted to note the impact, if any, of distance from the center on the procurement process. We also visited the field offices for Contract Operations, Procurement and Contracts Management Division, Office of Planning and Management, at Durham, North Carolina, and Cincinnati.

We interviewed EPA officials and project officers and examined pertinent legislation, regulations, plans, studies, guidelines, and files at the offices we visited.

CHAPTER 2

ORD'S CHANGES TO IMPROVE PLANNING AND MANAGEMENT OF RESEARCH ACTIVITIES ARE ENCOURAGING BUT NOT YET PROVEN

Congressional hearings in 1976 and 1977 indicated that ORD was not satisfactorily identifying and fulfilling EPA's research needs for sound scientific information to support its environmental regulatory decisions. Studies completed during this period by the National Academy of Sciences and the Office of Technology Assessment reinforced this finding. These critics of EPA's research program attributed its lack of success mainly to:

--Inadequate coordination between ORD and EPA's program offices.

--Insufficient attention to long-term research.

--Lack of peer (experts inside and outside of EPA) review of research plans and results.

Over the last few years, ORD has taken steps to correct the weaknesses found in its research program, including:

--Establishing 13 research committees to coordinate planning with program offices and to assist in providing internal review of EPA's research efforts.

--Establishing an office within ORD to serve as a focal point for identifying and sponsoring long-term research.

--Preparing and partially implementing guidelines for obtaining peer review of EPA's research programs, projects, and results.

In addition, ORD is designing an information system to better track the progress and status of individual ongoing research projects.

These steps, if properly implemented, should improve EPA's research program. However, when we completed our review in March 1980, none of these actions had been fully implemented and so their effect was largely unknown. It will probably be several years before the effect of these actions on improving research quality can be fully assessed. This chapter discusses EPA's progress in implementing its revised research planning and management system. Also discussed are some issues that need more attention, including:

--Program offices' opportunity to influence the size and scope of ORD projects actually undertaken to meet their research needs.

--An ORD system to track the progress and status of research projects.

--Effective peer review of EPA's research activities.

CONCERNS THAT LED TO CONGRESSIONAL ACTION

Criticisms of EPA's research program by the Congress, the National Academy of Sciences, and the Office of Technology Assessment were summarized by the Senate Committee on Environment and Public Works in a report prior to the enactment of the Environmental Research, Development, and Demonstration Authorization Act of 1978 (Sen. Rep. No. 95-188, May 16, 1977). These criticisms involved inadequate coordination among program offices, too little long-term research, and lack of peer review of research activities.

Inadequate coordination

Because of its concern about EPA's inadequate internal coordination, the Senate committee considered earmarking 60 percent of authorized research funds for activities funded through the program offices. The committee believed that ORD, the recipient of EPA's research funds, had been emphasizing research that related only generally to program offices' needs for research results to implement legislatively mandated regulatory programs. The committee stated that ORD should provide a creditable research base to support these programs and avoid what had become a pattern of acting essentially in response to court-ordered compliance.

At hearings held on May 3, 1977, EPA acknowledged that coordination was a real problem and indicated that the Agency was studying it. Because of this situation and the recent change in top management at EPA, the committee decided not to allocate research funds for program offices to manage.

Insufficient long-term research

The committee stated in its 1977 report that critics had charged for several years that EPA's crisis-oriented style of management was not conducive to long-term research. The report said that environmental degradation often is delayed and a deleterious environmental health effect may not be realized until several years after a pollutant is first introduced. Therefore, an effective environmental protection strategy must be able to predict harmful effects before widespread damage is done. The committee pointed out that the essential element of such a capacity is a well-funded, long-range research program.

The committee recommended that the Congress specifically authorize EPA to perform long-term research. The House Committee on Science and Technology and the Senate Committee on Environment and Public Works in conference proposed for fiscal year 1978 that at least 15 percent of all program-related research and development funds be earmarked for long-term research. The Congress enacted this provision and also included special provisions for long-term research in EPA's research and development authorization acts for fiscal years 1979 and 1980.

Lack of peer review

EPA must make important regulatory decisions to enforce complex environmental laws on the basis of highly technical data and related regulations about which there is often disagreement. The committee believed that much of the criticism of EPA could be avoided if the Administrator's decisions were fully supported by scientific and technical information that had been reviewed by competent scientific authorities.

The National Academy of Sciences expressed a similar sentiment in its 1977 report entitled "Research and Development in the Environmental Protection Agency":

> "Projects and programs, as well as proposals, must be reviewed periodically to assure their scientific and technical merit, the relevance of projects to the scientific and technical goals of programs, and the relevance of programs to the Agency's missions. Because the credibility of research performed by or for a regulatory agency is sometimes questioned, EPA must take exceptional measures to assure that its results are scientifically valid.

> "In particular, it is imperative that the final results of all scientific and technical activities performed by or for EPA be submitted for review and evaluation on the merits by scientific peers both inside and outside the Agency, to provide an independent assessment of the scientific validity of each research project."

In response to these concerns, the Congress on November 8, 1977, required that the Administrator of EPA:

> "* * *submit to the President and the Congress a report concerning the most appropriate means of assuring, on a continuing basis, that the research efforts of the Agency reflect the needs and priorities of the regulatory program offices, while maintaining a high level of scientific quality." (Sec. 7(c), Environmental Research, Development, and Demonstration Authorization Act of 1978 (91 Stat. 1257-1263)).

On June 30, 1978, EPA submitted the required report entitled "The Planning and Management of Research and Development Activities Within EPA," which discussed the causes of the problems and the corrective actions it had developed. The report basically confirmed the problems with EPA's research program that had been noted by others. The revised system which the report stated would be implemented to improve the program called for, among other things, establishing permanent research committees and incorporating provisions for peer review throughout the planning and management process.

ORD's actions to improve its research program appear responsive to the concerns expressed by the committee and others. However, at the time of our review, the revised system had not been fully implemented. Therefore, the following comments cover ORD's progress mostly through March 1980.

RESEARCH COMMITTEES HAVE IMPROVED COORDINATION, BUT MORE NEEDS TO BE DONE

To better coordinate the planning and management of its research activities, EPA has established 13 research committees. As of March 1980 these committees had spent most of their time (1) reviewing and participating in the planning of EPA's fiscal years 1979, 1980, and 1981 research programs and (2) developing multiyear strategies for use in planning the agency's subsequent years' programs.

Because high priority was given to planning, the committees had not yet had an opportunity to devote much attention to reviewing the quality of ongoing and recently completed research. Therefore, the anticipated impact of these research committees had not been fully determined.

Membership and responsibilities of the research committees

On March 15, 1978, EPA initiated pilot projects for planning and managing the Agency's research activities in five areas--drinking water, industrial wastewater control, mobile source air pollutants, pesticides, and gas and particles. Based on a year's experience with these five committees, EPA concluded that the committee approach for planning the Agency's research and development efforts had great potential for enhancing ORD's response to EPA's needs for scientific information. Therefore, EPA established seven additional research committees in May 1979. On February 15, 1980, the ORD Assistant Administrator established a 13th research committee to focus on EPA's energy research and development program. ORD expects the 13 committees to participate in the planning of activities that will account for 93 percent of EPA's fiscal 1982 research and development program funding. The 13 committees are:

Drinking water

Water quality

Solid waste

Radiation

Mobile source air pollution

Oxidants

Gases and particles

Hazardous air pollutants

Chemical testing and assessment

Pesticides

Municipal wastewater and spill prevention

Industrial wastewater

Energy

These committees are comprised of representatives from EPA's major organizational components--regulatory (program), enforcement, regional, planning and management, and research and development. Each committee is cochaired by a senior manager from ORD and a senior manager from the cognizant regulatory program office. The research committees seem to have a relatively good mix of representatives from the various EPA offices. However, at the time of our review; ORD was seeking ways to increase the participation of representatives from the regions and the Office of Planning and Management. 1/ The 13 committees have a total of 258 members as shown in the following table.

Organizational component	Total committee members	Percentage of total
ORD	149	58
Program offices	58	22
Regions	23	9
Office of Planning and Management	13	5
Enforcement	12	5
Other Federal agencies	3	1
Total	258	100

The Deputy Director for Operations, Office of Research Program Management, ORD, told us that ORD membership on the committees is large because ORD has many different laboratories working in each committee's area of concern. He added that, in most cases, the committees resolve issues through negotiation and consenus; and, in those few cases where committees vote, the votes are distributed equitably.

In general guidelines issued to the research committees on March 23, 1979, the Assistant Administrator, ORD, charged each committee to

--Review the fiscal year 1979 research program to familiarize members with the status of ongoing work.

--Review fiscal year 1980 research plans and formulate appropriate recommendations for improving them.

1/The Office of Planning and Management performs the agencywide management functions required to implement the broad range of EPA programs and is headed by an Assistant Administrator.

- --Participate in developing fiscal year 1981 research plans.
- --Develop a multiyear research strategy sufficiently detailed to be used as a primary planning document in subsequent years.
- --Review the quality of ongoing and recently completed research.

Research and program officials generally satisfied with committee concept

Most ORD and program officials expressed satisfaction with the research committee concept, although their experience to date is limited. They said that the committees had improved communications and were a better way of planning EPA's immediate and long-term research needs. According to these officials, more respect and understanding was developing among ORD, program, and regional officials of the others' responsibilities and needs.

Personal contact and informal relationships among ORD and program officials, while still important, were playing a smaller role in determining research program content. For example, the Director and Deputy Director of the Criteria and Standards Division of the Office of Drinking Water stated that they have always been able to communicate their research needs and have them accepted into the research program. They said that the Director of the Water Supply Research Division, the ORD coordinator of drinking water programs at the Municipal Environmental Research Laboratory at Cincinnati, has always been sensitive to their research needs.

On the other hand, the Associate Deputy Assistant Administrator for Pesticide Programs believed that the research committees had tremendously improved communication between ORD and the Office of Pesticides. He believed that his staff needed more contact with ORD through a more formal structure than had been available in the past and that the research committee concept was a good step in that direction. He added that the research committee offers the pesticide program a more effective mechanism for communicating its research needs.

However, six of nine senior EPA headquarters program officials whom we interviewed in late 1979, including those mentioned above, expressed concern about problems for which the research committees are not fully responsible. These officials said that they should

- --have an opportunity to concur that the final size and scope of research projects to be undertaken by ORD will satisfy their research needs and
- --be kept better advised of ongoing projects' progress and status.

These matters are discussed below in more detail.

Program offices are not participating in determining size and scope of projects

Program offices do not always have an opportunity to participate with ORD in determining the size and scope of research projects undertaken. ORD believes that it is best able to make this determination.

Senior officials of three program offices--the Director of the Criteria and Standards Division, Office of Drinking Water; Chief of the Municipal Technology Branch, Office of Water Program Operations; and the Associate Deputy Assistant Administrator for Pesticides Programs--expressed concern about this problem. For example, the Director of the Criteria and Standards Division, Office of Drinking Water, said that in some instances ORD had agreed to that office's research needs during preliminary program planning, but the office was not consulted during final technical planning of the projects undertaken. According to him, in some cases the completed research was not useful because the projects were improperly designed or the results were not needed.

In its July 28, 1980, comments on this report, EPA stated that these projects were epidemiology studies and that ORD has since taken steps to improve that program.

Senior officials of five program offices--Deputy Assistant Administrator for Chemical Control (Toxics); Associate Deputy Assistant Administrator for Solid Waste; Director, Strategies and Air Standards Division; Senior Technical Adviser for Mobile Source Air Pollution Control; and Acting Deputy Assistant Administrator for Water Planning and Standards--expressed satisfaction with the situation. They said this was due primarily to their success in developing informal cooperative working relationships with the laboratories' staffs. An official of the sixth office--the Deputy Assistant Administrator for Testing and Evaluation, Office of Toxic Substances--said that in the past his office's research needs had not been specifically determined; therefore, he was not in a position to comment on the matter. However, he believed that procedures to be developed by the cognizant research committee will provide adequate opportunity for his office to review and influence the size and scope of individual ORD project proposals for meeting future research needs.

Like other Federal agencies, EPA establishes its program priorities for a given fiscal year according to the zero base budgeting concept. The program offices submit their research needs to the appropriate research committees, which then give direct input to those who prepare the research and development budget. Tentative decisions on whether projects will be done in-house or outside EPA are made as part of this process. The Offices of Deputy Assistant Administrators at ORD headquarters then prepare guidelines and definition of output commitments for the laboratories. The guidelines include draft output plans that (1) describe specific products for the various programs and (2) propose deadlines by which the laboratories must deliver these products to specific clients (program offices or others).

The laboratory directors evaluate their resource capability to accomplish the proposed research by the requested dates and negotiate any changes they deem necessary with ORD headquarters officials. The laboratory directors then prepare plans that outline the approach for accomplishing each commitment, including information for the ORD planning office, program office, or research committee to use in evaluating the appropriateness of the approach and assessing whether it will produce the desired results by the deadline.

This planning process is completed several months before the approved projects are actually started. No formal procedures exist for the laboratories to obtain program offices' concurrence that the intended research approach and the estimated completion dates are still valid for meeting their needs. Such procedures would permit a determination of whether the program offices' needs have changed since the initial planning and would help reduce the possibility that unnecessary or low priority research is conducted.

Better reporting needed of project status and progress

Program offices are particularly interested in knowing whether projects are progressing so they can supply any information needed to meet their commitments. Senior officials from five of the nine EPA headquarters program offices told us that they needed better periodic reporting from ORD on the progress and status of all projects being performed to meet their research needs. Most laboratories only report quarterly on major projects. ORD was aware of this problem and was developing a computerized system to store information on all projects.

A senior management analyst in ORD's Office of Technical Information, Research Program Management, told us that there are no firm plans to produce periodic reports from that system for distribution to program offices, research committees, and others that would permit them to readily determine the status and progress of such projects. However, he said that this capability will be considered for the system after it begins operating about March 1981.

Development of this system was initiated by the Office of Technical Information in September 1977. The head of that office told us that the system was designed initially for use by EPA program and research offices and others outside EPA to determine--through either direct access or requests to his office--what research was being done in a particular area and when the results could be expected. That official believed that the system could also fulfill a project status and progress reporting function.

Extensive information on all of the approximately 3,400 ongoing or recently completed projects being administered by about 1,250 project officers was already stored in the system in April 1980. However, the ORD senior management analyst told us that two or three checks still must be conducted of the quarterly process of inputing and updating information in the system. When ORD is satisfied that the process is functioning properly, the system will be further evaluated to determine its usefulness for meeting program offices' needs. Program offices will be asked to comment on the system. Assuming that no problems arise, ORD expects to begin operating the system about March 1981. ORD appears interested in establishing a workable project tracking system.

GREATER ATTENTION BEING GIVEN TO LONG-TERM RESEARCH

Section 6(a) of the Environmental Research, Development, and Demonstration Authorization Act of 1978 requires that the Administrator of EPA establish a program to conduct continuing and long-term environmental research and development. Further, the act requires that at least 15 percent of any funds appropriated to EPA for environmental research and development be allocated for long-term work. To comply with these requirements, the Assistant Administrator, ORD, has:

- --Established a program under which selected headquarters and laboratory personnel are relieved of their normal duties to engage in innovative research.
- --Established three exploratory research centers across the Nation and proposed that four more be established.

ORD's goal for fiscal year 1982 is to satisfy the congressional mandate that EPA spend at least 15 percent of its extramural research funds (about $40 million) on long-term research. On November 29, 1979, the Assistant Administrator requested EPA's Office of Planning and Management's approval to establish an Office of Exploratory Research within his office to serve as a focal point for EPA's long-term research. Although not formally approved as of April 8, 1980, that office was operating under existing authorities of the Assistant Administrator.

It was too early for us to evaluate these long-term activities for inclusion in this report. A general discussion of what has been planned and accomplished follows.

Innovative research program

A September 8, 1978, memorandum from the Assistant Administrator, ORD, to his Deputy Assistant Administrators, laboratory directors, and office directors announced an innovative research program. Under this program ORD staff members may request approval to conduct relevant studies that might not match EPA's immediate regulatory research needs. The studies proposed under this program should generally be designed to last about 1 or 2 years and seek to (1) identify a potential or future environmental problem, (2) describe a new approach for solving a problem, or (3) advance the fundamental scientific understanding within environmental science. Project results must be applicable to EPA's research needs or demonstrate a need for additional EPA involvement. Also, these results must be suitable for publication in peer-reviewed scientific literature and for presentation to ORD senior management staff.

As of April 10, 1980, 42 proposals had been received and evaluated--11 had been approved. Eighteen additional proposals had been received and were being evaluated. ORD estimated that the studies to be conducted under the 11 approved proposals would cost about $1 million. A description of several of the approvals follows.

- --A chemist at EPA's Environmental Research Laboratory, Duluth, Minnesota, received $79,500 for the first phase of a 2-year study to determine what fossil fuel combustion wastes in acid rain are released into freshwater via soils and sediments. The project will be conducted at the Duluth Laboratory.
- --A microbiologist at EPA's Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, received $55,000 for the first part of a 2-year study to determine the best conditions for growing and isolating natural viruses that affect human health. The project will be conducted at the Cincinnati Laboratory.
- --An aquatic biologist at EPA's Environmental Research Laboratory, Narragansett, Rhode Island, received $38,400 for the first part of a 2-year search of international scientific literature on elementary metal composition in marine and estuarine animals. The information will focus on metals that pose potential health hazards via marine food chains. The study will be conducted at the Laboratory of the Marine Biological Association of the United Kingdom, Plymouth, England.

Exploratory research centers

On December 19, 1978, ORD announced the initiation of an institutional center support program. These centers are to be supported primarily through institutions or organizations with well-established expertise in a specified research area and a demonstrated commitment to such research. The centers' programs will focus generally on long-term (3 to 5 years or longer) exploratory research to provide the link between basic and applied research as related to EPA's missions. Centers' programs are expected to provide an added capability and potential for accomplishments beyond those possible by supporting individual projects. Purposes of these centers include:

- --Serving as a resource for EPA laboratories within a given research area to fill research gaps and address areas requiring greater attention.
- --Stimulating EPA's applied research programs.

- --Providing better communication between EPA and the academic community.

- --Serving as a source for new talent.

The centers will be supported generally through cooperative agreements, which require substantial involvement by EPA in directing the centers. As of March 31, 1980, EPA had entered into such agreements with the Universities of Pittsburgh and Illinois and a consortium of the University of Oklahoma, Oklahoma State, and Rice University. Four additional agreements were to be entered into during fiscal year 1980. In the long-term, each center could receive a minimum of $500,000 each year--assuming an acceptable level of performance and subject to EPA's receiving necessary appropriations.

PROGRESS IN PROVIDING PEER REVIEW OF RESEARCH HAS BEEN SLOW

In the June 30, 1978, report to the Congress and to the President (see p. 10), EPA stated that the uneven quality of its research pointed up the need for qualified scientific peer review of its research plans and findings. However, ORD has been slow in developing and implementing procedures for obtaining peer review. As of April 1980--about 22 months after EPA submitted the report--probably the most significant peer review made of its research activities consisted of 2-day reviews of two major research programs conducted by the ORD Assistant Administrator. New or revised procedures for conducting peer review of various research activities either had not yet been fully developed or had only recently been implemented. For example:

- --Research committees had not developed procedures for obtaining peer review of their strategies.

- --Laboratory directors did not finalize plans for obtaining peer review of their research programs, projects, and research results until March 1980.

The Assistant Administrator first issued general peer review guidelines to ORD offices and laboratories on February 23, 1979. Other guidelines were issued on October 10, 1979, and January 28, 1980. Each of these documents proposed peer review of (1) individual research projects, (2) research results, and (3) research programs. Response to that guidance was disappointing to the Assistant Administrator.

In his guidelines to the research committees (see p. 12), the Assistant Administrator strongly urged the committees to seek outside reviews of their multiyear research strategies to gain different perspectives on EPA's research needs.

Peer review of research committees' strategies not planned

As stated earlier, in March 1979 the Assistant Administrator instructed the research committees to develop multiyear strategies to show the kinds of research needed and the general approach that should be taken to meet the identified needs. Strategies that cover a 5-year period were completed and submitted to the Assistant Administrator in May 1980 by all except the Energy Research Committee.

The Acting Chief, Program Coordination Staff, ORD, told us that procedures had not been established for obtaining peer review of these strategies. Further, he said that no firm plans exist to develop such procedures. Although the Acting Chief agreed that it may have been beneficial to obtain peer review of the strategies during their initial preparation, higher priority tasks had prevented ORD from doing so. He added, however, that peer review of the strategies may be obtained when they are updated during preparation of EPA's fiscal year 1983 budget. That budget process would start in early 1981.

Laboratories' plans for peer review only recently developed

At the time of our review in April 1980, ORD's laboratory directors had just recently submitted final plans and reportedly begun their implementation to provide peer review of their research activities.

The laboratory directors first submitted peer review plans in December 1978. The Assistant Administrator said that, for the most part, these plans were descriptions of the "status quo," varying quite widely in scope and effectiveness. In his October 1979 guidelines, he asked that the laboratory directors formulate new plans for adequate and feasible peer review of research results to be disseminated through Government publications. After reviewing these plans, the Assistant Administrator still was not fully satisfied.

Accordingly, on January 28, 1980, he issued final peer review guidelines and instructed the laboratory directors to revise their plans as necessary to conform to those guidelines. These plans were to include provisions for:

--ORD's senior laboratory management to encourage, when appropriate, the publication of research results in professional literature.

--Peer review (of an unspecified nature) to be obtained of research results not published in professional literature.

--Significant projects (those involving an expenditure above a predetermined level) to be reviewed by at least three non-EPA peers.

--Projects not designated as significant to be reviewed during the annual laboratory program review by the cognizant deputy assistant administrator, including, whenever possible, non-EPA peers.

In a March 3, 1980, memorandum the Assistant Administrator informed his deputy assistant administrators that their responses and those of the laboratories in meeting the February 29, 1980, deadline for submitting peer review plans had "been frankly disappointing and less than enthusiastic." He added that each laboratory should furnish a revised peer review plan to his office by March 7, 1980. According to a special assistant to the Assistant Administrator, the revised plans were all submitted to headquarters about March 7, 1980, and the laboratories began their implementation about that time. Because they were so new, we did not review those plans or the laboratories' initial efforts to implement them.

Assistant Administrator's plans to provide peer review of major ongoing research programs

In his February 23, 1979, guidelines, the Assistant Administrator, ORD, stated that peer review at his level should be provided of EPA's research programs. A review of that portion of EPA's health and ecological effects research program concerned with biolgical testing and testing approaches to predict or assess exposure-effects relationships of environmental pollutants was conducted in July 1979 as the first in an anticipated series of such reviews. Numerous individuals from outside ORD were invited.

In a December 5, 1979, memorandum to the Assistant Administrator, the Director, Office of Research Program Management, ORD, proposed modifications for improving future reviews based on experience gained from the initial review. These proposals included:

- --Developing a more precise statement of the purpose of the reviews.
- --Identifying a narrower topic for each review so that it can be discussed substantively in the time devoted to each review.
- --Abandoning the "open forum" approach in conducting the reviews and replacing it with specific presentations from ORD panel members, allowing time for discussion after each.
- --Making a greater effort to identify technical issues relating to the scientific quality of research being reviewed to ensure that outside participants have an opportunity to provide valuable opinions.
- --Allowing more time (by expanding review sessions generally to 2 days) for outside participants to make their recommendations.
- --Broadening the roster of outside experts invited to the reviews by asking for suggestions from (1) individuals outside EPA, (2) the National Academy of Sciences, (3) the National Science Foundation, and (4) EPA's Science Advisory Board.

The Assistant Administrator concurred in these proposals on December 11, 1979. Under this concept, three or four reviews will be held each year on different topics selected by the Assistant Administrator. Each review will be on a major identifiable program, such as drinking water research. An integral feature of the review series is to obtain fresh and different perspectives and judgment from scientific experts outside ORD. The second program review in the series was held in April 1980 on analytical chemistry for organics in soil, sediment, and biological tissue.

Participants and attendees at the April 1980 review session included representatives from ORD headquarters and laboratories, appropriate research committees, interested EPA headquarters program offices, EPA regional offices, other Federal agencies, and non-Federal organizations. Persons outside EPA who were invited to that review included 11 from universities, 2 from private industry, 1 from the Department of Agriculture, and 1 from the Office of Management and Budget.

CONCLUSIONS

ORD has devoted a lot of effort over the last 2 years to designing and implementing a new system to provide better research results for program offices to use in making regulatory decisions. The system is intended to provide more effective planning, monitoring, and review of ongoing and completed research projects. At the time of our review, ORD had concentrated much of its effort on planning, and, for the most part, policies and procedures for implementing the new system were still either being developed or tested.

Research committees comprised of representatives from different EPA organizational components appear successful in improving coordination within EPA and in improving research planning. However, two areas require more attention to ensure the system's success. First, we believe that ORD and the program offices need to establish procedures for mutually agreeing, immediately before the start of each project, that the approach and anticipated completion date will provide results at an appropriate time for the interested program office's use in fulfilling its regulatory mission. Also, ORD must continue to develop effective ways to provide peer review of EPA's research activities.

RECOMMENDATIONS

We recommend that the EPA Administrator have the Assistant Administrator, ORD:

--Establish procedures that require regulatory offices and laboratories to agree before work is started that the approach and timing of research projects are reasonable to meet intended needs.

--Require the research committees to obtain peer review of their multiyear strategies.

AGENCY COMMENTS AND OUR EVALUATION

In its July 28, 1980, comments EPA stated that the report accurately describes actions taken to correct legitimate past complaints about its extramural research program. However, EPA expressed the belief that it was further along with improvements than we described and that its progress warranted a stronger affirmation of its corrective actions.

Research strategies and budget planning

The research committee system was one area where EPA thought greater progress had been made than we described and disagreed that the impact of these committees had not yet been fully determined. EPA stated that the research committees have submitted research strategies for review throughout the agency and prepared fiscal year 1982 decision units (budget justification documents that describe research activities in a regulatory area and show their proposed funding levels)--a culmination of many months' work.

EPA added that the decision units prepared by the research committees have recently been reviewed by media task groups as a part of the fiscal year 1982 zero base budget formulation process. Although each group has the authority to modify decision units to reflect its perception of the Agency's priorities, EPA pointed out that preliminary analysis indicated that the groups did not significantly modify the research decision units. EPA believes this is an indication of the research committees' success in shaping research efforts to be responsive to the needs of program offices.

On pages 12 and 13, we stated that the Assistant Administrator, ORD, had charged each committee to participate in developing the Agency's research program and that most ORD and program officials said that the committees had improved communication between them and were a better way of planning EPA's research needs. The research committees' experience with the fiscal year 1982 budget formulation process--as EPA describes--appears to further confirm this. Also, on page 20, we acknowledged the status of the research committees' strategies.

However, the research committees had not completed their preparation of the fiscal year 1982 decision units at the time of our review. The research committees have not yet had an opportunity to specifically review the quality of ongoing and recently completed research. As EPA indicated, this review will be important to determining the need for future research. Accordingly, we continue to believe that the research committees' impact has not been fully determined.

Size and scope of research projects

EPA disagreed with our recommendation that ORD should establish formal procedures for seeking the appropriate program office's concurrence, immediately before the start of a project, that the planned approach and anticipated completion date appear reasonable. It is EPA's view that project development is the internal management concern of ORD's deputy assistant administrators and that they must be allowed the discretion to allocate laboratory resources to best satisfy the sometimes conflicting requirements of the 13 research committees. EPA said that the deputy assistant administrators are responsible for initiating projects that are responsive to the guidance given in the research strategies and decision units.

EPA agreed that it is possible for 13 months to elapse between review of a laboratory's fiscal year operating plan by program offices and the actual start of a project. However, EPA maintains that the shifting needs of the program offices can be accommodated by requests--through research committees--for changes in the allocation of resources or the time frame for completing a project. EPA added that although there was not yet uniformity in the research committees' performance, in many committees there has been interaction between ORD laboratories and program offices concerning projects' applicability to program office needs within a relatively few months before the research is undertaken.

We believe that there should be uniformity in all research committees' determination of projects' applicability to program offices' needs shortly before a project is started. This practice would offer greater assurance that limited research funds are spent effectively and that all research undertaken will be responsive to program office needs.

Peer review of research activities

EPA stated that it was further along in providing peer review of its research plans, programs, and projects than we indicated. The report described the status of the major activities at the time our field work was completed in April 1980.

Other examples of completed peer reviews cited by EPA--which we did not mention--included its Science Advisory Board's review of the planning process followed by 5 of the 13 research committees (completed between August 21, 1979, and July 21, 1980) and the National Drinking Water Advisory Council's review of the drinking water strategy. Also, EPA stated that the Science Advisory Board was reviewing the strategy documents of three research committees and the Board had recently participated in a pesticide program review at ORD's

Gulf Breeze Laboratory. EPA also pointed out that ORD had initiated a system of peer review of grant applications, which we discuss in chapter 4.

The additional examples of peer review cited by EPA, in our view, do not change our conclusion that much remains to be done. EPA's efforts and plans to obtain peer review, if properly implemented, should improve research quality. However, in our opinion, the effectiveness of such activities is and will remain uncertain for some time.

Our recommendation that EPA require the research committees to obtain peer review of their research strategies is still appropriate.

CHAPTER 3

LIMITED RESOURCES HAMPER MANAGEMENT OF EXTRAMURAL RESEARCH PROJECTS

Project officers in EPA laboratories, in our view, were technically qualified--by academic credentials as well as experience--to manage assigned extramural research projects. However, their opportunity to adequately monitor the performance of research projects was hampered because of

--heavy workloads that included responsibility for more projects than they could effectively manage and

--travel fund limitations that did not permit an adequate number of visits to the research performers' sites to make sure that projects were being properly conducted.

Careful management attention is needed to control the quality of EPA's research. As mentioned previously, most of EPA's research is conducted under contracts, grants, and cooperative agreements. EPA's scientists and engineers are assigned to managed research projects as project officers. Effective management of these projects requires that these individuals have proper technical expertise and enough time to devote to each project for which they are responsible. They should also have the opportunity to visit project sites as necessary to maintain proper oversight of the extramural research being conducted.

We did not try to evaluate whether these factors adversely affected the timeliness or the quality of research results because that was outside the scope of this review. However, 14 of the 24 project officers we interviewed said that they were unable to adequately monitor the technical progress of their extramural projects because they lacked the time and/or the travel funds to do so. Therefore, it would seem that the quality of research must be reduced to some degree.

Our review included discussions with 24 project officers at four EPA laboratories and analysis of questionnaire responses which they provided. The 24 project officers (1) represented about 10 percent of those managing projects and (2) were responsible for about 16 percent of all ongoing projects at the four laboratories.

PROJECT OFFICERS APPEAR TO HAVE ADEQUATE QUALIFICATIONS

EPA's research and development activities encompass all fields of scientific and engineering disciplines, such as microbiology, organic chemistry, and sanitary engineering. Project officers' academic credentials and experience indicated that they were technically qualified to manage assigned research projects.

Of the 24 project officers interviewed:

--All had received at least a bachelor's degree.

--Nearly 80 percent had advanced academic degrees; 8 had master's degrees and 11 had doctorates.

Further, 63 percent of the approximately 380 professionals at the four laboratories had advanced degrees; however, all are not responsible for managing research projects.

Academic credentials alone do not ensure that an individual can adequately manage research projects; experience is also important. EPA generally considers scientists or engineers at the GS-13 grade level or higher as senior project officers and those at GS-12 or lower as junior project officers. Seventy-five percent of all project officers at the four laboratories were senior level. The 24 project officers we interviewed outlined their professional experience to us. Our analysis of their experience indicated that each of the 12 senior project officers had extensive experience managing research projects.

One project officer we interviewed had 16 years Federal experience in research and development activities. He had served as project officer on numerous in-house and extramural research projects in the area of manned spacecraft propulsion systems involving thermal control (heat transfer) design, propellant chemistry and hydraulics, and high temperature materials while employed for 7 years by the National Aeronautics and Space Administration. After joining EPA in 1970, he served as project officer on research projects related to powerplant flue gas desulfurization. Since 1974 he has been program manager for research and development efforts for control of waste and water pollution from coal-fired powerplants.

As expected, junior project officers generally had less experience; however, they also managed relatively fewer and less complex projects. The 12 junior project officers were responsible for managing an average of about 6 projects, whereas the senior project officers were responsible for an average of about 11 projects. Further, the 12 junior project officers were generally managing projects lasting less than 2 years--one indication, according to EPA, of less complexity. Senior project officers on the other hand were generally managing projects of between 2 and 5 years' duration.

To the extent possible, the EPA laboratories assign research projects to their scientists and engineers on the basis of their academic background and experience. The project officers we interviewed agreed that the projects assigned to them were within their area of technical expertise.

WORKLOADS OF PROJECT OFFICERS LIMIT PROJECT MANAGEMENT CAPABILITY

Successful research management depends on the amount of time the project manager can spend on management. As EPA increases its dependence on extramural research, the management role of scientists and engineers as project officers becomes more important to the success of EPA's research mission. It appears, however, that many project officers do not have enough time to adequately manage assigned extramural research projects.

EPA project officers are an essential element in translating general program objectives into quality research and development results. Extramural project management duties include defining the approach and scope of the research to be performed, participating with EPA's contracts management and grants administration divisions in the selection of contractors and grantees, monitoring technical progress of the projects, and reviewing final reports for technical accuracy and utility.

In addition to being responsible for managing extramural research efforts, project officers may be required to devote major portions of their time to (1) conducting in-house research, (2) providing technical assistance to EPA regional and program offices, State and local governments, and industry, (3) planning EPA's future research activities, and (4) other duties, including attending training courses, symposiums, and conferences and performing various administrative tasks.

The 24 project officers we interviewed devoted a substantial portion of their time to duties other than managing extramural research projects, as shown in the following table.

Average percentage of time devoted by selected project officers

Task	Research laboratories			
	Cincinnati		Research Triangle Park	
	Industrial Environmental	Municipal Environmental	Industrial Environmental	Health Effects
In-house research	7	15	7	44
Technical assistance	21	14	8	5
Planning	11	10	13	12
Other	5	11	10	7
Total	44	50	38	68
Management of extramural research	56	50	62	32
Total	100	100	100	100

A 1977 EPA study of project officers' duties related to extramural research activities of the Cincinnati Municipal Environmental Research Laboratory estimated that about 20 staff-days annually were needed to manage each active extramural project. The Director of ORD's Office of Research Program Management agreed with this estimate.

Eleven of the 24 selected project officers told us that their workload was too heavy. A detailed analysis of the time they estimated was devoted to their various duties showed that none appeared to have enough time to adequately manage their assigned extramural research projects.

Project officer	Extramural projects assigned	Estimated days needed annually to manage projects (note a)	Estimated days spent on project management (note b)	Estimated percentage of time spent of time needed
1	16	320	73	23
2	14	280	88	31
3	18	360	134	37
4	16	320	143	45
5	15	300	150	50
6	12	240	121	50
7	10	200	134	67
8	7	140	99	71
9	8	160	132	83
10	6	120	99	83
11	6	120	108	90
Average per project				50

a/Based on 20 days per project.

b/Based on percentage of time project officer estimated that he/she had devoted to extramural project management during calendar year 1979, assuming 220 staff-days are available in a work-year.

Synopses of project officers' comments about their inability to devote sufficient time to project management follow:

> I do not have adequate time because other duties, such as justifying expansion of the division's program, must be given higher priority.
>
> If I only had projects to manage, the time available to me would be marginal. However, recent emphasis has been on program office support and peer review to upgrade the scientific quality of research done. This is not wrong, but it takes a lot of time from project management.

> I don't have as much time as I would like. Although we are not doing a terrible job, being able to devote additional time to projects would improve research quality.

An indication of the problem's extent is illustrated by the fact that 13 percent of all project officers in the four laboratories we visited had management responsibility for 11 or more extramural projects. Using the 20-day criteria and recognizing that other duties make up a significant part of their workloads, it is highly questionable whether these project officers have enough time in a year to properly manage their projects.

We recognize that demands placed on a project officer's time for project management cannot be measured simply by the number assigned to him or her. The complexity (size and scope) and stage of completion are also important factors. Further, a great deal depends on the technical capability of the performer. For example, one project officer stated that he had to spend only minimal time with a particular contractor because that contractor had expertise in the project area and a full understanding of the project's objectives. Another project officer believed that some contractors get awards through the procurement process (mainly via superior written proposals), even though they have limited knowledge of the project's specific technical area. These contractors require more of the project officer's attention. Therefore, while some extramural research projects may require less than 20 days of a project officer's attention in a year, some may require more days.

EPA has no guidelines on the optimum number of research projects a project officer can efficiently manage. However, laboratory managers are aware of the workload problem. They generally agreed that they do not have enough laboratory personnel to adequately manage the extramural workload along with other responsibilities. To help relieve the situation, laboratories have:

--Hired permanent part-time professionals in a limited number of cases that do not count against full-time personnel ceilings. (For example, a chemist was hired but authorized to work only 39 hours per week.)

--Attempted to distribute workloads as equitably as possible.

INSUFFICIENT TRAVEL FUNDS OFTEN PREVENT NECESSARY SITE VISITS

Site visits are important to project officers for properly overseeing the performance of research by contractors and grantees. However, travel fund limitations often prevent project officers from making visits as frequently as necessary. Nine of the 12 senior project officers and 5 of 12 junior project officers we interviewed expressed dissatisfaction with their opportunities to make site visits. Several said that they were able to make only about one-half of the site visits they believed necessary. Although others were apparently able to make a higher percentage of needed trips, they also considered the inability to make sufficient site visits an important factor limiting their potential for properly managing projects.

Senior project officers told us that an adequate number of timely site visits could have major benefits on individual projects, such as (1) reducing cost and time overruns, (2) providing greater assurance that desired research results are obtained, and (3) learning of recent findings that may be useful in managing other projects. Junior project officers were generally less concerned. They said that, because of the nature of projects assigned, (1) contractor or grantee sites were often close enough that necessary visits could be made with a minimum expenditure of funds, (2) the nature of the research did not require close scrutiny, or (3) the contractors or grantees were perceived as being competent to perform the project with very limited monitoring.

EPA has not given the laboratories guidelines on site visits and has made little effort to adequately plan the number or the timing of such visits. The decision about whether a visit to a contractor or grantee should be made rests primarily on the professional judgment of the responsible project officer, his or her workload, and the availability of travel funds. Unfortunately, the lack of travel funds too frequently seems to be the deciding factor. In order to get travel approved to visit a particular extramural performer whose work has reached a critical point, it is sometimes necessary for project officers to schedule visits to other project sites as part of the trip. Although visits to these other contractors or grantees may be useful, the timing may not be the best for the project officer to review the work being performed.

Project officers use other monitoring techniques to supplement site visits. Periodic written progress reports, telephone contacts, and visits by contractors' and grantees' personnel to laboratories are several such techniques. They also may ask other project officers visiting the same or nearby contractors and grantees, or who may conveniently do so in conjunction with trips made for other purposes, to check on the status of their projects. Project officers said, however, that other monitoring techniques cannot substitute for personal site visits.

Most project officers were unable to estimate the extent to which projects had suffered from their inability to make site visits. However, one project officer said that probably 10 to 15 percent of projects which he had managed had been seriously hampered by a lack of site visits. Two examples are discussed below.

Example A

One project officer said that a contractor spent a large portion of the $185,000 awarded for an 18-month project on a peripheral experiment to generate data that EPA had obtained from another source. A site visit had been made at the start of the project and the project officer thought that the contractor fully understood the experiments to be emphasized. Another project officer from the laboratory with some knowledge of the purpose of the work subsequently visited that contractor's site when in the area and concluded that the research was being conducted as intended. Written progress reports by the contractor also indicated that the project was going well. It was not until several months later that the responsible project officer learned that only about 50 percent of the experiments for which EPA had awarded the contract would be accomplished.

The project officer believed that the contractor simply did not fully understand EPA's purpose in sponsoring the project. He said that this situation could have been easily avoided if sufficient travel funds had been available for quarterly visits to the contractor's site.

Example B

Another project officer told us that lack of a timely site visit resulted in EPA's not obtaining any value from a $35,000 contract. Although the contractor probably would not have been able to perform the desired research satisfactorily even if site visits had been made, the project officer said that the work could have been redirected or stopped.

A technical evaluator of the proposal concluded that the contractor's understanding of the planned work was excellent and that the "work plan should serve well to establish the feasibility" of the concept in question. The evaluator further stated that the personnel assigned to the project appeared to be highly competent both as scientists and technical experts. His only concern was that there was no evidence that the personnel had "hands-on" expertise in the area.

The project officer's evaluation of the contractor's performance stated that the contractor (1) failed to use established procedures to conduct the research even though these procedures were used in the industry and were readily available and (2) was unsuccessful in fulfilling the scope of the work.

The Director, Office of Research Program Management, ORD, told us that during a period of severe budget constraints, travel funds are highly subject to reduction. Accordingly, the Director said that EPA must be careful to use its travel funds as efficiently as possible. However, he added that although EPA has not performed a cost-benefit study of the matter, in his view the procurement of research through contracts and grants is cost-effective even though some project officers may be unable to visit the performers' sites as often as they wish. We did not address the cost-benefit issue as part of this review.

Because of the questionable use in prior years of carryover funds to exceed travel estimates for certain purposes, the Congress reduced EPA's fiscal year 1980 total travel funds by $2 million. The Congress urged EPA to tighten travel controls to ensure that only essential trips are funded. The Congress' intent clearly was to authorize only enough funds for fiscal year 1980 to meet priority travel needs. As a result, travel funds of the four laboratories included in our review were reduced 2 to 13 percent for fiscal year 1980. This reduction coupled with an anticipated high inflation rate (that could push travel costs up) and a probable increase in extramural projects to be managed should worsen the situation.

In fiscal year 1979, the average amount of travel funds spent per project at the four laboratories we visited was obviously insufficient for adequate monitoring of some projects. The following table shows average amounts spent per project at the four laboratories.

Laboratory	Extramural projects	Travel funds spent for program operation and direction (note a)	Average per project
Industrial Environmental Research Laboratory, Cincinnati	413	$91,300	$221
Municipal Environmental Research Laboratory, Cincinnati	301	71,900	239
Industrial Environmental Research Laboratory, Research Triangle Park	257	119,304	464
Health Effects Research Laboratory, Research Triangle Park	293	18,704	64

a/The laboratories' categories for summarizing travel fund usage did not include a category exclusively for site visits. These amounts, however, were used mostly for that purpose.

It is interesting to note that although the Cincinnati Industrial Environmental Research Laboratory had 61 percent more extramural projects than the Research Triangle Park Industrial Environmental Research Laboratory, it spent 23 percent less total travel funds for site visits and 52 percent less per project. Even though the Research Triangle Park Health Effects Research Laboratory had more projects than the Industrial Environmental Research Laboratory at that same location, the Health Effects Laboratory spent 84 percent less travel funds and 86 percent less per project.

The number of projects that were being performed near the laboratories, along with other factors such as projects' stage of completion, would affect the amount of travel funds needed for site visits. However, project officers told us that projects are frequently awarded to contractors and grantees that are long distances from the laboratories. For example, project officers at the Research Triangle Park Laboratories were responsible for managing projects in Arizona, Colorado, California, Iowa, Illinois, Ohio, and Texas. Project officers said that getting site visits to these contractors approved is sometimes difficult because of their locations.

EPA's top management is responsible for seeking adequate resources from the Congress to effectively carry out its programs. However, EPA's travel requests are not supported by detailed cost estimates of the purposes for which the requested funds will be used--particularly project officers' visits to extramural research performers' sites. Travel requests by the laboratories are based primarily on past experience and what they believe are realistic estimates of their needs. The travel funds made available are generally less than requested. Therefore, it is especially important that careful attention be given to the use of these limited funds to ensure--to the maximum extent possible--that essential needs are met. The following table shows how the four laboratories used travel funds in fiscal year 1979.

	Cincinnati				Research Triangle Park			
	Industrial Environmental		Municipal Environmental		Industrial Environmental		Health Effects	
Purpose	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Site visits (note a)	$ 91,300	41	$ 71,900	38	$119,304	43	$ 18,704	10
Planning and evaluation	33,400	15	27,400	15	48,512	17	24,314	13
Meetings, seminars, and conferences	31,200	14	57,200	30	56,175	20	101,560	54
Technical assistance	13,400	6	9,100	5	26,491	10	22,444	12
Other (note b)	53,300	24	22,400	12	28,235	10	20,013	11
Total	$222,600	100	$188,000	100	$278,717	100	$187,035	100

a/See footnote on p. 36.

b/Includes expenses for consultants, training, public involvement, staff meetings, and program orientation.

Closer scrutiny by laboratory managers of travel fund usage might permit more site visits. At least one laboratory director is concerned about the problem. In an October 23, 1979, memorandum to his division heads, the Director of the Cincinnati Municipal Environmental Research Laboratory stated that fiscal year 1980 was going to be a very difficult travel year. He instructed them to eliminate all lower priority travel and particularly to reduce travel to professional meetings, conferences, and training courses so that enough funds would be available for more essential travel.

CONCLUSIONS

We believe that EPA project officers' education and experience make them qualified to manage extramural projects. However, many project officers have responsibility for more projects than they can effectively manage. In addition, limitations on travel funds in some cases prevent project officers from making timely visits to contractors' and grantees' sites to determine whether the research is being conducted to best meet EPA's needs.

These factors could reduce the quality of EPA's extramural research projects to some extent. EPA in effect must gamble--in those cases where its project officers cannot adequately monitor extramural projects--that useful research will result from projects primarily because of the contractors' or grantees' initiative.

In our view, EPA has not done enough to justify to the Congress its need for additional travel funds or to ensure that its laboratories give proper consideration to site visits--certainly a priority function--in their use of the limited travel funds available.

RECOMMENDATIONS

We recommend that the EPA Administrator have the Assistant Administrator, ORD:

--Determine the amount of travel funds needed for project officers in the laboratories to adequately monitor the performance of extramural research.

--Use that information in (1) seeking additional travel funds in future years from the Office of Management and Budget and the Congress and (2) justifying within EPA a larger allocation of its current travel appropriations.

--In the meantime, instruct all laboratory directors to make sure that necessary site visits to performers of extramural research receive high priority in the use of travel funds now available.

AGENCY COMMENTS AND OUR EVALUATION

EPA agreed that project officers' workloads and travel funds for site visits to their extramural projects require attention. However, EPA stated that relief for neither is wholly at the discretion of EPA management. EPA added that in the past it had consistently sought travel funds for this purpose, but the Congress reduced EPA's travel request by $2 million for fiscal year 1980 and the House of Representatives' Appropriations Committee has proposed a cut of $250,000 for fiscal year 1981. 1/ In addition, EPA noted that the Office of Management and Budget imposes both personnel and travel ceilings.

EPA disagreed with our recommendation that it seek appropriations specifically earmarked for site visits because it would split a resource already under continuous scrutiny. EPA also stated that we had not demonstrated that EPA laboratories might need to place higher priority on site visits--compared to other purposes--in their use of limited travel funds.

We believe that EPA can and should do more to justify additional travel funds for site visits. The Deputy Director for Operations, Office of Research Program Management, ORD--in elaborating on EPA's written comments--told us that EPA's requests for additional travel funds for site visits were made during discussions with Office of Management and Budget officials and congressional committee staffs. He said that such requests were not supported by documentation showing specific needs. We believe that such information would be beneficial to these reviewers when considering EPA's needs for additional travel funds for site visits.

EPA pointed out that in comparing one laboratory's percentage of travel funds used for site visits to another's, the report does not consider the types of awards or the laboratories' missions. According to EPA, these factors could significantly alter the necessity of site visits. EPA said that our disclosure that the Research Triangle Park

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1/The House Committee recommended that the 1981 reduction primarily apply to international travel for cooperative programs between the United States and the Union of Soviet Socialist Republics.

Health Effects Research Laboratory used 54 percent of its fiscal year 1979 travel funds for its personnel to attend meetings, seminars, and conferences and only 10 percent for site visits does not support the position that closer scrutiny by laboratory managers might permit more site visits. EPA objected to what it perceived as an implication by us that the use of travel funds for meetings, seminars, and conferences--intended to keep its staff current in their respective disciplines--is not a high priority use.

As EPA suggests, we did not review the propriety of the Research Triangle Park Health Effects Research Laboratory's use of more than 50 percent of its travel funds for meetings, seminars, and conferences. Nor did we conclude that this type of travel should be eliminated. Our point is that closer scrutiny of all proposed trips could result in some site visits--that otherwise might not be made--being considered a more effective use of a laboratory's travel funds than other trips.

In this regard, it should be noted that two of three senior project officers interviewed at the Research Triangle Park Health Effects Research Laboratory told us that they were able to make only one-half or less of the site visits that they believed necessary.

Finally, as pointed out on page 39, the Director of the Cincinnati Municipal Environmental Research Laboratory instructed his staff to reduce travel to meetings and conferences. It is certainly probable that lower priority trips--even if not to meetings and conferences--could also be reduced at other laboratories to permit more site visits by project officers. In any case, we believe that laboratory directors should be instructed to make sure that site visits be given high priority in the use of travel funds.

CHAPTER 4

CONTRACT AND GRANT AWARD PROCEDURES NEED IMPROVEMENT

Our review and internal studies by EPA indicated that:

--Research projects often have been delayed because contract awards were slow and generally took much longer than EPA anticipated.

--The research grant awards process was susceptible to bias and did not encourage the competition needed to attract innovative researchers.

In fiscal year 1979, ORD spent more than $214 million for research projects done by outside organizations. A larger amount, about $230 million, is estimated for fiscal year 1980. This extramural research accounts for about 70 percent of EPA's research appropriation for those years and is generally awarded to private commercial firms,univerisities, State and local governments, other Federal agencies, and nonprofit organizations through contracts, 1/ grants, 2/ cooperative agreements, 3/ and interagency agreements. 4/

We confined our review to contracts, grants, and cooperative agreements because they comprised 77 percent of ORD's outlay for extramural research and were agreements with organizations outside of the Federal Government. Because grants and cooperative agreements are similar except for the degree of EPA's involvement, we will refer to both as grants except in cases where the difference is important to the discussion.

1/Used whenever the principal purpose is to acquire property or services for the direct benefit or use of the Federal Government.

2/Used when money or anything of value is transferred to a recipient to accomplish a public purpose of support or stimulation authorized by Federal statute and no substantial involvement is anticipated by the Federal agency during the performance of the activity.

3/Same as a grant, except that substantial involvement between the agency and the recipient is anticipated.

4/Used between Federal agencies, or between a Federal agency and a State or local government, where goods or services are provided with or without monetary reimbursement.

Problems involving the monitoring and evaluation of contractors' and grantees' performance are discussed in chapters 3 and 5.

THE CONTRACT PROCUREMENT PROCESS

The function of contract procurement is centered in EPA's Procurement and Contracts Management Division and the operational responsibility is implemented in the division's three operations centers at headquarters; Durham, North Carolina; and Cincinnati, Ohio. Generally, the center at Durham handles procurement for the 4 ORD laboratories at that location, while the Cincinnati operations center handles procurement for the remaining 11 laboratories.

A project officer and a contracting officer from a contracts operations center work together to implement the procurement process for each contract. These two principal participants are supported as needed by other contracts office staff and the Offices of Audit, Finance, General Counsel, and Property Administration.

For procurements costing $10,000 or more project officers start the process by preparing the procurement request package, which includes

--a statement of the work to be done;

--the proposed budget;

--the estimated period of performance;

--the interim and final reports desired;

--a list of recommended sources where the services could be obtained;

--criteria for evaluating the technical merits of those who compete for the contract; and

--in some cases, a justification for awarding the contract through a noncompetitive process.

The contracting office uses this information for soliciting contractors to do the work; thus, the procurement request package must be adequate to enable the office to issue a solicitation which will let each competing contractor know precisely what is expected to be done and how the technical merits of his/her proposal will be evaluated. Therefore, the contracting office must review the package to be sure it is complete and consistent with law, policy, regulations, and other requirements. When the procurement package is approved, the contracting office solicits proposals from contractors to do the work.

Later, when proposals are received, the project officer enters the process again to evaluate the technical merits of each proposal according to criteria developed in the procurement request package. He/she is assisted at this stage by a technical evaluation panel of others knowledgeable of the technical aspects of the procurement. This panel scores the proposals and presents those it considers adequate to the contracting officer, who considers them in context with cost and other factors to determine those proposals still competitive for selection.

During the process the contracting office also holds discussions, as needed with contractors to settle unclear points, negotiates final agreements with contractors, and makes the final selection for award. The advice of the project officer is sought throughout the process.

THE RESEARCH CONTRACT AWARD PROCESS IS NOT TIMELY

We examined 39 competitive and 25 noncompetitive research contracts awarded during fiscal years 1978 and 1979 to determine if project officers adequately perform their extramural research procurement responsibilities.

On a basis of past contracting experience, EPA has established standard acquisition leadtimes for competitive and noncompetitive contracts. EPA expects that the standards will be met in most cases. However, standard acquisition leadtimes were seldom met in the research and development contracts we sampled. The EPA standard of 156 days for competitive contracts was exceeded by 39 percent. Likewise the standard of 119 days for noncompetitive contracts was exceeded by 17 percent. The following table shows the average leadtime in days for the 64 contract awards.

	Competitive contracts (note a)			Noncompetitive contracts (note b)		
Laboratory	Number	Days	Average days	Number	Days	Average days
Environmental Monitoring Research Laboratory, Las Vegas	8	1,483	185	9	1,000	111
Industrial Environmental Research Laboratory, Cincinnati	6	1,543	257	6	818	136
Municipal Environmental Research Laboratory, Cincinnati	11	2,045	186	4	656	164
Health Effects Research Laboratory, Research Triangle Park	6	1,488	248	2	158	79
Industrial Environmental Research Laboratory, Research Triangle Park	8	1,895	237	4	856	214
Total	39	8,454	217	25	3,488	139

a/Standard 156 days.

b/Standard 119 days.

Longest delays occur at two stages

Our review showed that the longest delays occurred at the presolicitation stage, during which project officers are responsible for preparing the procurement request package, and the evaluation stages, where project officers review proposals for technical merit. The following table shows average times required to complete the various procurement stages for the contracts in our sample.

Stage	Competitive		Noncompetitive	
	Standard	Average (note a)	Standard	Average (note a)
Presolicitation	20	50	15	46
Solicitation to closing date	30	38	30	29
Technical evaluation	11	85	35	39
Negotiation, contract preparation, review, and award	95	44	39	25
Total	156	217	119	139

a/Leadtime may be longer than our statistics indicate because in some cases procurement request packages are returned to project officers for correction of serious shortcomings before the procurement process is officially given a starting date.

Analysis of the sample contracts indicated that project officers caused the greatest delays in the procurement process because they failed to

- --prepare adequate procurement request packages within established time frames and
- --complete technical evaluations of contractors' proposals within established time frames.

Project officers need to improve procurement request packages

As the first step in the procurement of extramural research through contracts, project officers must prepare request packages that adequately describe the scope of work to be done. Request packages initially submitted to contracting offices, however, are often so vague and general that they require substantial revision before requests for proposals can be issued to prospective contractors. As a result, the average time for completing this step in the procurement process exceeded EPA's standard by 30 days, or 150 percent for competitive contracts and 31 days, or 206 percent, for noncompetitive contracts.

Request packages are important because they contain the information on which the rest of the procurement process is based. If a contract is awarded on the basis of a poorly prepared procurement request package, the following are likely to result:

--Higher costs to the Government because of the contractor's uncertainty as to exactly what is to be accomplished.

--Problems in selecting the contractor with the best technical qualifications for the specific job because of inadequate criteria for evaluation.

--Poor research results because definition and scope of the work to be done is unclear.

Senior contracts management officials told us that procurement request packages submitted for their approval are often inadequate. For example, one of the contracts centers' chief of negotiated contracts estimated that about 98 percent have inadequacies that have to be corrected before requests for proposals can be issued to contractors. These officials stated that project officers often use vague, general language in the procurement request packages. The time necessary to complete the procurement is unduly delayed because these packages have to be returned, sometimes more than once, for clarification. We found that project officers require an average of two and one-half to three times the standard time to prepare procurement request packages that meet the requirements of the contracting office.

We asked contracting officials and project officers why they thought the problem with procurement packages existed. Senior contracting officials said that procurement packages are not prepared well because project officers

--fail to take time to do a thorough job of preparing the package because of heavy workloads,

--lack training in the technical requirements of a procurement package, and

--fail to follow the instructions in EPA's "Contracts Management Manual."

Project officers were not in total agreement. While they agreed that heavy workload is a factor, some also felt that

- --the contracts office does not adequately communicate with project officers,
- --often contracting officers do not understand the technical content of the procurement package and require needless clarification and rewriting by project officers, and
- --the procurement process contains too much "red tape."

None could suggest practical ways to eliminate the red tape in the procurement process.

Training has not been effective

It is difficult to prepare an adequate procurement package. EPA has offered basic training in the procurement process since 1973, but problems still exist. We believe that problems persist because the training did not concentrate on the areas where project officers need most help.

Basic course is too general to help

Beginning in 1973, EPA contracted with Ohio State University (June 1973 to July 1976), Harbridge House (September 1976 to August 1977), and Sterling Institute (March 1978 to present) to conduct basic training for scientific/technical/program personnel and other EPA personnel serving as contract project officers. Complete records were not available on the older contracts with Ohio State University and Harbridge House, but we were able to review the subject matter content and the participants' evaluations of the 3-day (21 hours) seminars conducted from March 1978 through February 1980 by Sterling Institute.

While most trainees in the 30 basic seminars presented through May 1979 felt that the training was profitable, some commented in their course evaluations that the seminars did not give specific workshop-type training in the areas they most needed. The training, which consisted of a comprehensive overview of the entire procurement process from beginning to end, did not concentrate enough on how to write a good statement of work and other areas that project officers consistently had trouble with. Trainees also wanted to have more help in the seminars from EPA contracting officials who could relate the instruction to specific EPA procurement problems better than instructors provided by the Sterling Institute.

New course shows promise, but attendance could be improved

In response to these comments, another course has been offered to concentrate training on specific problem areas. This course, which began in June 1979, also lasts 3 days, but it concentrates on the areas that, according to EPA, have presented the biggest problems; namely

--statement of work,

--evaluation criteria,

--source selection procedures, and

--justification for noncompetitive procurement.

The course also includes EPA contracting office personnel as particpants in a majority of the seminars.

As of February 1980, eight sessions of the new course had been given, each with space for a maximum of 27 trainees. Although the two given at Research Triangle Park and two at Cincinnati were convenient to the scientists at those locations and could have accommodated 108 trainees, only 76 attended. This included only 11 (about 3 percent) of the project officers from the two Research Triangle Park and two Cincinnati Laboratories from which we selected the contracts included in the sample mentioned on page 44.

According to the Chief, Contracts Policy and Review Branch, EPA did not require attendance at the basic or concentrated courses "because at first the courses were overcrowed anyway" and EPA assumed that project officers would feel the need to attend voluntarily. However, he said that over the past year attendance has dropped and fewer courses are being offered. Until EPA makes this training mandatory, we believe that the identified contracting problems can be expected to persist.

Technical evaluations of contract proposals also need to be more timely

Project officers could also shorten the procurement process if they completed the technical evaluation stage of the procurement process more promptly. We found that long delays occur at this stage. For example, technical evaluations of contractors' proposals for competitive contracts in our sample averaged almost 8 times the standard of 11 days. In one contract at the Industrial Environmental Research Laboratory in Cincinnati, the project officer required 5 months to evaluate 53 proposals. Contracting officials at Durham and Cincinnati said that although these delays unduly prolong procurement, the contracting office has no control over this stage of the process.

The project officer who initiates the request for research to be done by a contractor is the one best suited to evaluate the technical strengths, weaknesses, and risks of each offer to do the work submitted by contractors. For this reason the project officer is the chairman of the technical evaluation panel, which contains at least two other members who are knowledgeable of the technical aspects of the desired procurement. This panel's evaluation report is important because it determines which proposals are technically acceptable; justifies the relative ranking of proposals; and provides information the contracting office can use, if necessary, to advise unsuccessful competitors of the reason their proposals were not accepted. Consequently, the contracting office cannot proceed with the selection of a contractor until the panel's report has been submitted.

Project officers' and other panelists' busy schedules often make them unavailable when evaluations need to be done. Since the panel meets at least once, the availability problem is increased when the panel is large or, as is often the case, when some of the panel members are at another laboratory, at EPA headquarters, on travel, or engaged in other activities.

Obviously, more than the standard time is needed when a panel must evaluate technically complex proposals. But project officers could cut the time generally needed for technical evaluations by better planning and coordination of their activities and the activities of the other members of the evaluation panel.

GRANT PROCEDURES DISCOURAGED COMPETITION AND INNOVATION AND APPEARED BIASED

While grant awards have not been hampered by the delays that plague contract procurement, the awards process has presented problems. Reports on EPA's research activities by the National Academy of Sciences in 1977 and the EPA Science Advisory Board's Health Effects Research Review Group in 1979 identified problems in ORD's procedures for soliciting, reviewing, awarding, and managing research grants. In May 1979 the Assistant Administrator, ORD, convened a special group--the Grant Procedure Review Group--to review ORD's grant policies, procedures, and operations. The regulations (40 C.F.R. part 40), which ORD had followed in administering its research grants and cooperative agreements, had been "interim" since May 15, 1973.

The major problems identified by ORD and the others were that:

--Procedures for soliciting grantees appeared closed to new researchers and did not encourage competition.

--Procedures for predevelopment of proposals tended to inhibit creative, innovative research ideas by grantees.

--The ad hoc proposal review system was susceptible to bias.

Subsequently, on October 3, 1979, EPA proposed in the Federal Register (vol. 44, no. 193, 56955) revised policies and procedures for soliciting, reviewing, awarding, and managing research grant and cooperative agreements. Some of the proposed new procedures based on recommendations of the Grant Procedure Review Group involve

--expanded solicitation to attract a larger number of qualified competitors, including handicapped, minority, and female researchers;

--centralized peer panel review of all grant proposals to increase objectivity and eliminate the appearance of narrow and biased selection of researchers; and

--expanded, controlled ad hoc review of cooperative agreement proposals under which outside reviewers' names are provided to ORD laboratories from preapproved listings maintained by the Office of Research Grants and Centers to eliminate scientists' influence over selection of outside reviewers.

The new procedures would also make a clearer distinction between grants and cooperative agreements. Grants will be made mostly to support basic long-term research and will be administered from ORD's headquarters. Cooperative agreements, on the other hand, will support shorter term research and will require substantial involvement by project officers at the laboratories. This will allow these scientists to spend more of their time as researchers instead of devoting large amounts of time in the development, review, and management of grants.

These problems and EPA's corrective actions are discussed below in more detail.

Grant procedures appeared to discourage competition

ORD had discouraged competition by not openly soliciting a large number of proposals for grants and cooperative agreements. Although its extramural research interests were published annually in the "ORD Program Guide" that was distributed among research institutions, most proposals were solicited through informal contacts by ORD scientists with institutions across the country. ORD did not generally communicate its research interests to the scientific community through other avenues such as the Federal Register, the "Commerce Business Daily," and scientific publications.

The appearance of closed competition for grant awards was supported by the fact that according to ORD's Grant Procedure Review Group's August 1979 report, ORD funded 85 percent (1 out of every 1.2) of all research grant proposals formally received in 1977 and 1978. That group pointed out that by contrast the National Science Foundation and the National Institutes of Health funded 44 percent (1 out of 2.3) and 36 percent (1 out of 2.8), respectively, in 1978. The lack of competition and the limited number of formal proposals to select from gave ORD very little chance to choose possible creative, innovative researchers. A greater number of applications would have provided better choices of projects and also allowed new researchers to enter the system.

ORD also tended to concentrate its grant resources among few institutions. For example, Grant Procedure Review Group statistics show that 30 institutions of higher learning received 54 percent of all research grant awards in 1977 and these same institutions received 65 percent in 1978. The group concluded that while there may have been justification for concentrating grant resources among few institutions, many new researchers with innovative approaches to EPA's research needs may have perceived the system as inbred and been discouraged from applying for grant assistance.

Preapplication procedures may have discouraged innovation

Under the former system, grant proposals formally received by EPA may have been unsolicited or submitted after preapplication discussions. Unsolicited proposals were submitted with little or no prior contact with EPA. Other proposals, however, were the result of contact with a laboratory and negotiation between laboratory scientists and prospective grantees before formal submission.

ORD advised researchers seeking grant funding to hold informal discussions and preapplication negotiations with scientists to ensure that proposals met with the laboratory's research interests and that funds were available. Consequently, few unsolicited proposals were received.

During these preapplication negotiations, a scientist, who might have later become the project officer, had opportunities to negotiate modifications to proposals he/she found suitable and discourage the formal submission of others which did not or could not be modified to meet the laboratory's immediate needs. This process appeared to give undue control over proposal development to laboratory scientists and may have resulted in the rejection or modification of many creative, innovative ideas. Further, the process appeared to allow grants to be utilized in the same manner as contracts--to acquire services for the direct benefit or use of the Federal Government--rather than to support and stimulate research to encourage the initiative and creativity of the extramural researcher.

Some project officers we interviewed expressed a preference for grants over contracts because of these opportunities to exercise control over the selection of research performers to fulfill specific project needs without the long leadtimes and involved procedures required by contracts.

Ad hoc reviews appeared susceptible to bias

ORD's procedures for review and selection of grant proposals to be funded were susceptible to bias. While ORD claims not to have found instances of bias, its ad hoc system of grant proposal review was criticized in studies by the National Academy of Sciences and the EPA Science Advisory Board's Health Effects Research Review Group as not employing adequate external peer review to ensure objectivity and unbiased selection of the best qualified researchers.

ORD's former proposal review procedures utilized an ad hoc process which seemed to give the project officer undue control of the review and selection process. After formal submission of proposals, reviews and recommendations for funding were largely made by the same scientists who had already established interest in the proposals during the predevelopment, negotiation stage. These scientists, who usually would later become project officers, also had strong influence in selecting two outside scientists to assist in the review.

The entire process had the appearance of being controlled in-house by those who had already preselected the proposals for funding. Opportunities existed for biased judgments.

ORD's New Procedures Are Now Being Used

ORD began using the new procedures in December 1979. The revised 1980 "ORD Program Guide" that gives information about the availability of extramural funds and notice of change in procedures has been distributed. Nineteen thousand were printed and about 14,000 distributed as of March 20, 1980, compared to a total of about 9,800 distributed in fiscal year 1979. Solicitations for specific programs were being prepared for mailing.

ORD has also selected peer panels for grant review and selection in four research areas--environmental biology, health research, environmental chemistry and physics, and pollution control processes.

In commenting on this report, EPA provided us statistical information to show how its new solicitation process and publicizing efforts are increasing the number of applications for research grants, cooperative agreements, and demonstration grants. This information follows:

Period	Fiscal year 1979	Fiscal year 1980
10/1 through 6/30	645	1,122
10/1 through 9/30	815	(a)

a/Final results not yet known.

EPA stated that of the 1,122 applications received through June 30, 1980, 654 are applications for research grants. EPA pointed out that this number exceeded the total applications received for all assistance during the same period in fiscal year 1979.

EPA also provided statistics to show that in fiscal year 1980 it could achieve a ratio of 1 grant award for every 4.1 applications, or a 24-percent funding rate. As noted on page 52, under the old system, EPA funded 85 percent of all research grant proposals. EPA further noted that only 17 of 51 (33.3 percent) applications funded as of July 1980 under the new system were from investigators who had previously received research grants from EPA. Thus, EPA said 66.7 percent of its recent funding has been to investigators who are new to EPA. As noted on page 53, 30 institutions of higher learning received 65 percent of EPA's research grant awards in 1978.

EPA added that these statistics clearly show that its new grants program has accomplished two of its stated purposes --to increase competition by increasing the number of applications from which to select the awardees and to encourage applications from investigators not previously awarded grants by EPA. EPA also stated that the opportunities for misuse of the system are minimal.

These statistics were not available at the completion of our fieldwork and we have not verified them. However, assuming their accuracy, we would agree that EPA's new procedures have been initially successful in effecting improvements in its grants program.

CONCLUSIONS

EPA's ability to get quality research products from contractors is directly related to adequate participation in the procurement process by project officers. Their contributions in procuring outside research contractors are crucial to the successful implementation of important extramural research projects.

The process of selecting good contractors for extramural research in a timely manner should be as important to project officers as planning research that they will personally perform because both extramural and in-house research contribute to EPA's mission and meeting the deadlines imposed by the Congress. Therefore, project officers need to regard participation in the procurement process as a professional responsibility equal to other work and develop the skills and provide the time to do an adequate job.

Basic training in the procurement process is helpful, but project officers also need instruction in the areas that present the greatest problems. It appears that this will happen only if ORD requires all project officers to take the concentrated course which began in 1979.

ORD has taken positive steps to improve its procedures for making grant awards. Increased publicity about the program and shifting of solicitation from laboratory project officers should result in more grant applications of broader and more innovative technical range. The review panel mechanism should separate the project officer from the awards process and reduce the appearance of bias. The shifting of responsibility for grant management from the laboratories to the new Office of Research Grants and Centers within the Office of Exploratory Research (see p. 17) should also lighten project officers' workloads and give them more time to spend on other needed research.

RECOMMENDATIONS

In order to improve the timeliness of project offices' performance of their procurement responsibilities, we recommend that the EPA Administrator have the Assistant Administrator, ORD:

--Require all project officers who have not already done so to attend the concentrated training course.

--Make sure that project officers coordinate with their panels early in the procurement process so that technical evaluations can be scheduled promptly after proposals are received.

AGENCY COMMENTS AND OUR EVALUATION

EPA agreed that training and renewed emphasis on the necessity for timely evaluation of contract proposals would be highly desirable. Therefore, EPA stated that it concurred with our recommendations and intended to take necessary corrective actions.

CHAPTER 5

EVALUATION OF EXTRAMURAL RESEARCH PERFORMANCE

NEEDS IMPROVEMENT

EPA needs to improve its evaluation of contractors' and grantees' performance of extramural research projects. Such evaluations would give EPA information on contractors' and grantees' record for timely project completions, adherence to cost estimates, requests for changes, and quality of end products. Without this information EPA cannot be sure that past performance will be properly considered in selecting new award recipients. As a result, awards might be made to performers who do not have the best record or potential for providing high quality research.

Although EPA has procedures for evaluating contractors' performance, they have been implemented poorly. We found that evaluations were available from both the responsible project officer and contracting officer for only 36 percent of the 107 completed contracts we reviewed. Further, when available, these evaluations:

--Were often untimely; most were submitted 6 months or more after the contracts' completion dates.

--Provided only minimal insight into the contractors' performance.

--Were seldom used in assessing contractors' qualification for new awards.

We found the situation with grantees to be at least as dismal as for contractors. EPA has no formal procedures for evaluating and compiling information on grantee performance. Essentially, no technical evaluations are made beyond the project officer level, and even that is not systematically documented. Late submission of technical, financial, and other reports essential to the closeout of completed projects also points out the need for formal business evaluations of grantees' performances.

In April 1980 EPA was considering methods for evaluating grantees' and cooperative agreement participants' performance other than formal evaluations at the completion of each project. (See pp. 66 and 67.) Although still in the early stages of development, these methods, in our opinion, will not assure that adequate information is available to responsible officials for evaluating the qualifications of those seeking new awards and, more importantly, for identifying those who have performed poorly in the past.

Meaningful evaluations are necessary to document individual performers' compliance with the terms and conditions of their agreements with EPA to conduct research. This information can provide valuable insight into the qualifications of those seeking new awards and help in selecting the most qualified performers to conduct future research projects. We believe that EPA needs to give more attention to evaluating the performance of those conducting extramural research for EPA and to developing a system to establish a record of their performances.

EVALUATIONS OF CONTRACTORS' PERFORMANCE OFTEN WERE NOT MADE OR WERE UNTIMELY

Project officers and contracting officers often did not comply with procedures established for evaluating the technical and business performance of research contracts. EPA's contract management manual establishes procedures for evaluation of contractors' performance. These procedures call for both the contracting officer and the project officer to prepare an evaluation of the contractor's performance at the end of a contract.

Evaluations are required for each completed research and development contract valued at $25,000 or more. Procedures require that the originals of these evaluations be sent to the Contractor Relations Section at EPA headquarters to create within the Government a record of contractors' performance and provide a means for considering that performance in future procurement actions.

To assess compliance with these requirements, we selected a sample of 107 research contracts completed between October 1, 1976, and the middle of September 1979. The sample consisted of (1) all of the 37 contracts closed during the period by the Washington Contract Operations Branch and (2) a random selection of 70 of the 500 contracts closed during the period by the field contract operations branches at Durham (312 contracts) and Cincinnati (188 contracts). 1/

1/ EPA's procurement function is centered in its Procurement and Contracts Management Division, Office of the Assistant Administrator for Planning and Management. The operational responsibility is implemented in three Contract Operations Branches in Washington, D.C.; Durham, North Carolina; and Cincinnati, Ohio, which carry out the functions for EPA headquarters, laboratories, and other field offices.

Our analysis showed that evaluations of contractors' performance were not available at the central filing point from both the project officer (technical) and contracting officer (business) for 69 contracts, or 64 percent, of the 107 included in our sample. There was slightly better compliance with the evaluation requirements for contracts administered by the Contract Operations Branch, Washington, D.C., than for contracts administered by the two field contracting branches. However, even there both required evaluations were not available for 51 percent of the contracts. Details are shown in the following table.

Contract Operations Branch	Number of contracts	Evaluation submitted by: Only project officer	Only contracting officer	Neither officer
Washington	19	7	6	6
Cincinnati	26	9	0	17
Durham	24	4	5	15
Total	69	20	11	38

Late submission of evaluations

When evaluations were prepared, the responsible project officer and contracting officer often did not submit them within the time frame established by EPA's Procurement and Contracts Management Division--25 days after the completion of the technical phase and/or acceptance of the final end product under the contract. Of the 38 contracts for which both the project officer and the contracting officer submitted evaluations, in only 1 case were they prepared within that time frame. Only 12 were submitted within 6 months of the contract completion dates. In several cases, the evaluations were not submitted until more than 20 months after the contracts were completed.

Contract management personnel have been instructed to request--within 2 weeks after completion of a contract--that the contracting officer and project officer submit their evaluation. If the evaluations are not received as a result of the initial request, two followup requests may be made within a few months of the initial request. If no evaluations are submitted in response to these followups, these contract administrators have been instructed to close the files without them. Even though a contract file may be closed, the original copy of any evaluation submitted after that could and should be on file at the Contractor Relations Section--the central filing point.

Contracting officers and project officers have a poor record of submitting evaluations for several reasons. Some contracting officers and project officers told us that other duties kept them from giving the necessary attention to preparing evaluations. Another apparent factor was the officers' perception that the evaluations have little value in evaluating the qualifications of those seeking new awards. Also, in some cases contract management personnel did not promptly request the evaluations--sometimes not until a year or more after the contracts were completed. According to the Acting Director, Headquarters Contract Operations Branch, requests were late due to a large backlog of contracts in closeout status.

In our view these matters do not justify noncompliance with the established procedures for evaluating contractors' performance. First, preparing evaluations is a normal duty of contracting officers and project officers, and time should be allocated for it. Second, it is not these officers' function to judge the value of the evaluations. Finally, both contracting officers and project officers should be familiar enough with the status of contracts for which they are responsible to know when evaluations are due without having to depend on contract management personnel to request them.

EVALUATIONS PROVIDE ONLY MINIMAL INSIGHT INTO CONTRACTORS' PERFORMANCE

Despite the requirement that evaluations be accurate and complete in order to provide an orderly, uniform method of determining contractors' effectiveness for future consideration in contract awards, most did not give a good indication of a contractor's performance. Instructions call for the evaluator to give ratings--excellent, very good, average, poor, or unsatisfactory--in several categories. The evaluator is also required to provide a detailed narrative of the background material the ratings are based on and narrative recommendations and advice to others considering the contractor for future solicitations.

However, for the 38 contracts in our random sample for which both evaluations were available, we noted that:

--Required narrative comments were not made to justify some general ratings given by 14 contracting officers and 11 project officers.

--In those cases where all required narrative comments were made, those by 20 contracting officers and 15 project officers were so vague or general that they had little value for future reference.

EPA laboratory and contracting officials we interviewed said that project officers generally tend to rate the technical performance of the contractors higher than warranted. For the 38 contracts, project officers rated overall performance as follows.

Rating	Number of contracts
Excellent	8
Very good	17
Average	9
Poor	2
Unsatisfactory	0
None	a/ 2
Total	38

a/Project officers said overall rating was meaningless in two cases.

The laboratory and contracting officials we talked to indicated that higher ratings than deserved are sometimes given by project officers because they:

--Lack documentation of contacts with contractors concerning their level of performance, which would be needed to justify lower ratings.

--Seek to improve the contractor's quality of work during the project so that by the time the project is complete a more favorable rating can be given.

- --Are concerned that a low rating of a contractor's performance may reflect unfavorably on their ability to manage the project.

EPA officials were unaware of the quality of evaluations being made of contractors' performance. The Chief of EPA's Headquarters Procurement Management and Support Office, Contract Operations Branch, stated that the branch had not ascertained the completion rate and content of completed evaluations. The Procurement and Contracts Management Division Industrial Relations Officer responsible for maintenance of the central evaluations file was also unaware of the quality of the evaluations. During our review, that officer reviewed some evaluations and agreed that they could be improved. He said that completing evaluations properly will be emphasized and checked in the future.

EVALUATIONS SELDOM USED IN ASSESSING PROSPECTIVE CONTRACTORS' QUALIFICATIONS FOR AWARDS

Notwithstanding requirements for their use, evaluations of contractors' past performance are seldom used in assessing prospective contractors' qualifications for new awards. EPA's primary purpose in requiring that evaluations be prepared and maintained is to provide contracting officers and project officers with information on the past performance of prospective contractors about whom they have no personal knowledge. However, some contracting officers and project officers we interviewed said that the informal system of discussing the past performance of a contractor with those having knowledge of it provides more useful information than the formal system. This method could give them incomplete information because they could not reasonably be expected to know all others in EPA having knowledge of a contractor's performance.

Because of concern within EPA about whether its contractor evaluation system was being adequately used, the Director, Procurement and Contracts Management Division, sent a memorandum dated May 25, 1978, to EPA program officials. The memorandum stated that evaluations on contractors' past performance could provide information needed to, among other things:

- --Satisfy a contracting officer that a prospective contractor is tenacious, persistent, and capable of performing.

--Serve as a basis for a discussion between a project officer reviewing a proposal by a contractor and another officer who has knowledge of that contractor's performance.

More specifically, EPA's Procurement Information Notice on Source Evaluation and Selection Procedures states that a prospective contractor's record of past performance under prior Government contracts should be taken into account in deciding whom to select for new contract awards. Timely performance, history of cost control, requests for changes, and quality of the end project--although not included in the evaluation criteria used to judge the technical adequacy of proposals--should be considered in ranking proposals.

Some contracting officers and project officers offered a number of reasons why they do not use evaluations of contractors' past performance much in appraising contract proposals, including:

--The most recently completed ones are often not available from the Contractor Relations Section in Washington, D.C.

--Narrative comments, if furnished, are sometimes vague and general.

--More than the information on the evaluation forms is needed to justify to a contractor why its proposal will not be considered.

These comments show a lack of confidence in contractor evaluations and point up the need for EPA to take additional steps to improve them so that they fulfill their intended purpose of providing a reliable record of contractors' past performance.

EVALUATIONS NEEDED OF GRANTEES' AND COOPERATIVE AGREEMENT PARTICIPANTS' PERFORMANCE

In its 1977 report to EPA, the National Academy of Sciences stated that EPA should not continue to use extramural research performers who did not have a record of satisfactory performance. However, 3 years later, EPA still has not developed a formal system for evaluating grantee performance. Final closeouts of research grants were being made without a rating by either the responsible project officer or Grants Operations Branch [1] grant specialist.

EPA's system for approving research proposals has allowed project officers to exercise substantial control over selection of award recipients. Some project officers stated that they selected grantees based on the quality of applicants' written proposals and informal information about their capability, reputation for quality research, past performance, and other factors. Much of this information was gained from contacts through scientific organizations, review of journals and other literature, and personal contacts with individuals and institutions who might be potential grantees. They said that selection of grantees with known expertise ensured quality results. However, grantees' failure to submit research results in the agreed upon time was a problem we heard often.

EPA's Grants Administration Division responsibilities include conducting legal and administrative reviews of grantees' applications, preparing certain documents necessary to award and continue grants, and making sure that all agreements are complied with and reports are submitted at the end of the project. A Grants Operations Branch official we interviewed also did not appear too concerned about the lack of a system requiring formal evaluations of grantees' past performance. However, some EPA officials thought evaluation would be a good idea. However, adequate safeguards would have to be incorporated into the system to prevent an entire institution from being penalized for the unsatisfactory performance of one researcher or principal investigator.

EPA top management has recognized the need for and benefits of providing adequate evaluation of grantees' past performance. Early in May 1979 the Assistant Administrator, ORD, established the Grant Procedure Review Group to study EPA's grant policies and procedures. An August 1979 draft study prepared by that group addressed, among other things, EPA's lack of information on grantees' past performance and problems experienced in the closeouts of grants, including the receipt of completed reports. However, in our opinion, the procedures being considered for evaluating grantees' and cooperative agreement participants' performance may not provide adequate records of their performance.

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[1] This branch is part of the Grants Administration Division, Office of the Assistant Administrator for Planning and Management.

Technical performance evaluations not made

The Grant Procedure Review Group's study noted that once a project is funded, the project officer is solely responsible for the quality of research results. The report stated that because many projects are multiyear and there is a turnover of project officers, poor grant performers could survive in the system. Therefore, the study recommended that unsatisfactory performers be identified and made known to responsible officials for consideration in selecting award recipients.

ORD expects its new grants awards and administration procedures, as discussed on pages 51 and 52, to stimulate competition from a much larger number of individuals and institutions. Project officers will no longer have the degree of control which they formerly had over the selection of grantees. Many institutions which may not have been selected under former procedures will apparently be considered by review panels to receive grant awards. Yet ORD has not developed, nor does it apparently plan to develop, a system for evaluating and establishing a record of their performance. As a substitute, the Acting Deputy Director for Research Grants and Centers, Office of Exploratory Research, ORD, told us that:

--Headquarters personnel will visit grantees' sites, as appropriate, to monitor their performance and to keep them on track in conducting the desired research. The visits will be made primarily if potential problems are detected from review of grantees' progress reports, which are to be submitted no less than annually.

--Each grantee will be encouraged to publish research results in professional literature to assure the best scientific review of completed project results.

--Some grantees may be requested to present project results at periodic seminars, and provisions to that effect are incorporated in all agreements.

Because even preliminary results from recently awarded grants generally will not be available for about 2 years, ORD--as of April 1980--did not expect to begin holding these seminars until early in 1982.

The Deputy Director said that plans had not been completed for requiring cooperative agreement participants to present research results at similar seminars. In his view, the work accomplished under these agreements is not particularly suited for presentation and evaluation at seminars because (1) ORD laboratory personnel are substantially involved in the research efforts and (2) the research is performed over a relatively short time--generally 1 year or less--and the very specific intended purpose is either clearly achieved or not achieved. Nevertheless, he said that in a couple of years EPA may begin to include requirements in these agreements for participants to present research results at these seminars.

These actions, while commendable and probably needed for different reasons, cannot, in our opinion, be substituted for evaluations of individual grantees' technical and business performance prepared at the end of each project.

Closeout of grants has been slow

Grants Operations Branch personnel have experienced difficulty securing from many grantees the final technical, financial, and other reports necessary to document completion of projects.

The Grant Procedure Review Group discussed this problem in its August 1979 report. That report stated that after 12 months there was no record of the final reports having been received for 121, or 22 percent, of 549 grants completed from July 1975, through May 8, 1979. In addition, the report indicated that (1) numerous closeouts had been delayed in fiscal years 1977 and 1978 because needed reports from grantees were late and (2) ORD managers and laboratory directors did not always use this information when available from the Grants Administration Division even though it would be useful for evaluating grantees' performances.

The group recommended that the Grants Administration Division furnish information regularly on closeout delays to laboratory directors and other responsible officials.

The Grants Operations Branch issued revised closeout procedures which were effective November 1, 1979, and increased its staff of grants specialists from 6 to 18. The new procedures provide for specialists to work with the same grants throughout the entire period from proposal through closeout. This additional staff, adherence to the new procedures, and a more aggressive approach toward securing closeout items could greatly improve the business end of the grants program and ensure more timely reporting by grantees. However, at this time we cannot evaluate whether these changes will be fully effective in correcting the problems. In any case, we believe that EPA should evaluate grantees' business performance and retain those evaluations to establish a record of their compliance with closeout requirements.

CONCLUSIONS

EPA's established system for evaluating contractors' performance has been poorly implemented and therefore ineffective in creating a complete record within EPA on the quality of contractors' performance. EPA has no formal system of gathering information to establish a record of grantees' or cooperative agreement participants' performance in conducting research for EPA nor did EPA plan to develop such a system.

As a result, EPA may not be selecting the best performers to conduct its extramural research because of its inability to consider their past business and technical performance. Further, we believe that contractors, grantees, or cooperative agreement participants may have less incentive to meet their commitments and obligations in regard to cost, scheduling, and technical performance if EPA cannot effectively consider their performance when making new awards.

Most agencies have experienced situations in which grantees or principal investigators have proven unsatisfactory. EPA is no exception. To minimize the chances that poor performers obtain repeat awards, a system needs to be designed and implemented to provide information on the performance of grantees and cooperative agreement participants.

We realize that a research grant or cooperative agreement is to support research, not procure in the sense that one contracts to procure hardware. Grant- and cooperative agreement-supported research has potential to benefit society and should not be characterized by its ability to deliver specific products or services. Also, research in universities is performed in independent departments by independent, autonomous researchers who conceive, direct, and perform their own work, often assisted by graduate students. This autonomy and self-reliance is crucial motivation for the work being performed. Therefore, agencies supporting research must be sensitive to the adverse effect of external constraints that they impose upon researchers.

However, as inflation focuses attention on how public dollars are spent and competition increases for public contract and grant funds, it is important that past performance play a greater role in determining who receives research awards. Accordingly, we believe that EPA should evaluate contractors', grantees' and cooperative agreement participants' performance under each award made to perform research. These evaluations should be used by responsible officials when determining which potential recipients are best qualified to perform new projects.

RECOMMENDATIONS

We recommend that the EPA Administrator require the Assistant Administrator for Planning and Management and the Assistant Administrator, ORD, to:

--Have all project officers and contracting officers comply with the requirement to prepare good quality evaluations of contractors' performance, file these evaluations as required by established policies and procedures with the Contractor Relations Branch at EPA headquarters and require that evaluations be used in assessing the qualifications of those seeking new awards.

--Establish policies and procedures for grants and cooperative agreements similar to those that now exist for preparing and retaining evaluations of contractors' performance and emphasize the importance of grant specialists' and project officers' compliance with the requirements.

--Establish procedures for obtaining the review and concurrence of supervisors or other higher level EPA officials with evaluations prepared by contracting officers, grant specialists, and project officers of extramural research performance.

AGENCY COMMENTS AND OUR EVALUATION

EPA agreed that more could be done in complying with present EPA procedures for evaluating contractors' performance of research. According to its comments, this issue will be addressed by a planned contract management improvement task force.

However, EPA noted that evaluating grantees' performance is not as clear cut as evaluating contractors. EPA cited the following reasons for believing that evaluating grantees' performance is really not feasible:

--Grant projects address issues for which there are no set answers.

--Project periods are based on "hoped-for" results.

--Delays are frequent and usually not the fault of the investigator.

We agree that grant projects address issues for which there are no set answers. Nevertheless, we believe that EPA could benefit from knowing whether a particular grantee's failure to achieve the hoped-for results within the project period was due to some legitimate difficulty or whether any delays were indeed the investigator's fault.

EPA also stated that, under its new grant review procedures, those qualified to perform research under grants are generally well-known to the peer reviewers responsible for evaluating project proposals and that these reviewers theorically should help prevent awards to poor performers. EPA added that applicants provide resumes to show past performance. Further, EPA stated that the academic community has its own sanctions and research results published in peer-reviewed journals could be assumed to be worthwhile.

As noted earlier, EPA provided, as a part of its comments, information that indicates that its newly implemented grants solicitation process is successful in accomplishing two major objectives: to increase the number of applications from which to select awardees and to encourage more applications from investigators to whom EPA has not previously awarded grants. The 1,122 applications for grants, cooperative agreements, and demonstration grants through the first 9 months of fiscal year 1980 exceeded applications received for such assistance during the same period in fiscal year

1979 by 74 percent. With this large increase, it seems unlikely that panelists would know the qualifications of all applicants.

We also believe that EPA cannot rely on resumes provided by applicants to obtain an objective view of past performance. Similarly, while an applicant's record of having research results published in peer-reviewed journals is useful in evaluating his/her qualifications, it cannot substitute for a system that would record EPA's experience with that researcher.

Therefore, we believe that it is even more important now that EPA begin to develop a record of grantees' and cooperative agreement participants' performance--like that maintained on contractors--for future reference in selecting awardees.

We did not suggest, as EPA stated, the circulation of "black" or "grey" lists of poor performers. Evaluations of past performance would merely be one source of information for evaluating grantees' or cooperative agreement participants' capability to perform quality research.

EPA's comments on our concerns about project closeouts minimized the significance of overdue technical reports (results of project work). EPA stated that it did not view late project reports as a serious problem. According to EPA, while many overdue final reports cause closeout delays, some reports have been furnished to project officers and results are available or being used although they have not been recorded in the Grant Information Control System.

We are concerned about individual grantee performance. A grantee's timeliness in submitting a final project report would be only one factor considered in evaluating overall performance. But certainly it is important that a record be kept of grantees' timeliness in submitting all required business and technical reports.

EPA stated that ORD has moved toward requiring project results disseminated through seminars and publication in peer-reviewed journals as a better means of accomplishing its diffusion and dissemination roles. We made no comments on EPA's way of disseminating project results. However, as stated on page 67, grantees' participation in seminars and publication in peer-reviewed journals cannot, in our opinion, be substituted for evaluations of individual grantees' technical and business performance prepared at the end of each project.

As a final note EPA stated that we had not distinguished between a "business" and "technical" evaluation. EPA added that it had assumed that an evaluation would involve the quality of science rather than the financial soundness of the grantee's institution.

We agree that an evaluation of a grantee's technical performance is most important. However, we also believe that an evaluation of a grantee's performance of business-related responsibilities is also important. In addition to final technical reports, grantees must document various aspects of their overall performance and progress in conducting a project. In most cases, they must submit standard reports to EPA, including progress reports; financial management reports; invention reports (discloses improvements, developments, or discoveries); and various property reports. These reports provide useful information to those responsible for monitoring project activities and expenditures at EPA laboratories and headquarters. The way in which grantees prepare and submit these reports reflects their attention to the business aspects of projects. We believe that--as in the case of contractors--this performance should be evaluated.

In summary, we believe that grantees' performance of technical and business-related responsibilities should be evaluated and retained for reference in evaluating grantees' application for any new awards.

JOHN C. CULVER
IOWA

United States Senate
WASHINGTON, D.C. 20510

January 29, 1979

Mr. Elmer B. Staats
Comptroller General of the United States
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Staats:

We are writing to request that the General Accounting Office prepare two reports concerning research programs at the Environmental Protection Agency (EPA).

The first request involves EPA's "extramural" or contract research program. This program includes grants, contracts, and interagency or "cooperative" agreements designed to produce research results without the direct, day-to-day involvement of EPA personnel. We have gained the impression from a variety of sources that the program is not operating in an optimum fashion.

EPA's contract research program seems to be typified by a large number of relatively small contracts, each limited in scope, of short duration, and administered at a rather low level in the Agency. Consequently, EPA scientists must spend large amounts of time shepherding individual projects through Agency procurement procedures and complying with administrative "project management" requirements. In addition, research tasks are rather narrowly defined in many EPA contracts, possibly preventing outside investigators from using their own creativity and discouraging capable investigators from seeking EPA contracts.

The second request concerns an assessment of in-house support for EPA researchers. As part of this request, we are asking for a comparison of EPA research procedures with those of other high quality government and private laboratories.

A detailed outline of our information needs in this area is enclosed.

Sincerely,

George E. Brown Jr.
GEORGE E. BROWN, JR.

John Culver
JOHN C. CULVER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

28 JUL 1980

OFFICE OF
PLANNING AND MANAGEMENT

Mr. Henry Eschwege, Director
Community and Economic Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

The Environmental Protection Agency (EPA) has reviewed the General Accounting Office (GAO) draft report entitled "Promising Changes Made to Improve Extramural Research--But More Needs to be Done."

GAO prepared this draft report on the planning and management of the Office of Research and Development's (ORD's) extramural research over a period of at least one year. GAO examines legitimate past complaints about this program and accurately describes corrective actions which ORD has taken. While it claims that these corrective actions are promising, GAO suggests that as implementation is incomplete, it is too early to fully assess the impact of these actions. In response, EPA contends that we are further along with our improvements than GAO suggests, and that progress to date warrants a stronger affirmation of these corrective actions, particularly in regards to the Research Committee system and the new grants system.

Our comments on specific chapters follow:

Chapter 2, "Changes made to improve planning and management of Research Encouraging but Not Yet Proven."

> This chapter identifies past criticisms of EPA research planning and management: (1) lack of coordination with program offices; (2) not enough attention to long-term research; (3) lack of peer review. GAO describes the history of these critisms as well as steps taken to correct them. GAO claims that by the time of the completion of their report in March 1980, the impact of ORD's corrective actions was "largely undetermined because none had been fully implemented." (p10)

Concerning the coordination of research with the program offices, GAO acknowledges the history and activities of the Research Committee system in planning and developing research strategies, but notes that "because of the priority given to these efforts, the Committees had not yet had an opportunity to devote much attention to reviewing the quality of ongoing and recently completed research." GAO interviews revealed widespread approval of the Research Committee system, though six(6) of nine(9) senior program officials wanted opportunity to concur on the size and scope of research projects, and wanted to be kept informed of ongoing projects. GAO notes the time lag between the completion of the planning process and the actual start of research projects, and makes a formal recommendation (p.23) that we develop procedures for the program offices to concur, before the start of a project, on its approach and anticipated completion date. GAO describes ORD's emerging tracking system, noting that it is planned to provide status reports on projects by March 1981.

EPA Comment

We disagree that the impact of the Research Committees is as yet "undetermined." Since March 1980, the Committees have submitted research strategies for review throughout the Agency. They have also prepared the FY 1982 decision units for their research areas. These actions are a culmination of many months' work.

The Research Committees prepared decision units which the Agency's Media Task Groups, functions of the Agency ZBB process, recently reviewed. (Decision units, with their funding levels, are descriptions of research activities in a given regulatory area.) During this review, the Media Task Groups also evaluate and coordinate budget proposals for all Agency offices in the context of the Group's perception of Agency priorities for a particular area, such as air, water, or solid waste. Each Media Task Group has the authority to modify decision units so that they reflect these priorities.

Preliminary analysis of the results of these deliberations indicates that the Media Task Groups did not significantly modify the decision units which ORD submitted. This can be credited to the Committees' success in shaping research efforts to be responsive to the needs of the program offices.

The GAO observes that the Committees had not yet had an opportunity to devote much attention to reviewing the quality of ongoing and recently completed research. This conclusion is basically accurate, although most of the Committees have at least broadly reviewed the existing program as a means of determining the necessity for future research.

GAO charges that program offices do not always have an opportunity to participate with ORD in determining the size and scope of research projects. This is the case for both organizational and managerial reasons. Project development is the internal management concern of ORD's Deputy Assistant Administrators in their role as line managers. The DAA's are responsible for initiating projects which are responsive to the guidance given in research strategies and decision units. In order to best satisfy the sometimes conflicting requirements of the thirteen Research Committees, the DAA's must be allowed the discretion to allocate laboratory resources. Program offices are, however, involved in determining the size and scope of research efforts affecting them when they participate in the activities of specific Research Committees. This process reflects management improvements in ORD.

GAO recommends that EPA obtain program office concurrence immediately prior to the start of a project to assure that the planned approach and completion date are still valid for meeting their needs.

It is true that Laboratory Operating Plans(LOP's) for the coming fiscal year are reviewed in August by both the Research Committees and the program office representatives to the Committees, and that it is possible for 13 months to elapse between review of an LOP and the initiation of a project. However, shifting needs of the program offices can be accommodated by requesting, through the Research Committee, changes in the allocation of resources or the timeframe for the completion of a project. This timing is largely dictated by the Federal Executive/ Congressional budget cycle.

While there is not yet uniformity in Research Committee performance, interaction in many committees, and informal relationships between ORD laboratories and program offices have greatly improved and allow for an assessment of applicability within a relatively few months before research is implemented.

A second major GAO criticism of ORD's planning is that ORD conducts insufficient long-term research. GAO describes the establishment of Research Centers, the Innovative Research Program and the Office of Exploratory Research, but feels it is "too early to evaluate these long-term activities."

EPA Comment

We basically agree that it is too early to properly assess these programs. Initial activities and responses from Research Centers have been extremely encouraging, as has been our early experience with the Competition Grant program. Continued favorable responses will encourage an increase in long-term research.

GAO contends that ORD lacks proper peer review of research efforts. GAO charges that ORD's efforts have been slow; 22 months after the date of the June 30, 1978 report to the Congress ("The Planning and Management of Research and Development Activities Within EPA") we had conducted only two Assistant Administrator-level reviews of major programs using peer review. Research Committees have not developed procedures for peer review of strategies and Laboratory Directors did not finalize peer review plans for their programs until March 1980.

EPA Comment

Again, we have made more progress than GAO indicates. The report suggests that little peer review is currently ongoing. This is not the case, however. Peer review mechanisms now exist and have existed at the laboratory level. The Agency's Science Advisory Board(SAB), for example, recently participated in a pesticides program review at ORD's Gulf Breeze laboratory. As a needed improvement to peer review mechanisms in various laboratories, the Assistant Administrator for Research and Development called for laboratory peer review plans to impose uniformity, consistency, and improvement upon these peer review activities. All new laboratory peer review plans began in March, 1980 (not "some" as the GAO report notes) and are now in place. These plans, which are now being implemented, assure that all significant projects will be peer-reviewed. This review offers a needed reinforcement of peer review of Research Committee strategies. We also intend to peer-review our detailed operating plans output for fiscal year 1981.

The GAO notes that Research Committees have not developed procedures for peer review of strategy documents. This is true. The GAO does not recognize however, that the SAB has already reviewed Research Committee planning processes for Pesticides, Solid Waste, Oxidants, Mobile Sources, and the groundwater portion of Drinking Water. Also, the SAB is in the process of reviewing the Radiation Research, the Mobile Sources and Pesticides Strategy Documents at the time of this writing. Further, the National Drinking Water Advisory Council has reviewed the Drinking Water Strategy Document.

Also, on the subject of peer review, ORD has initiated a system of peer review of grant applications, discussed in a later chapter. This system has been in place for nearly a year.

Chapter 3, "Limited Resources Hamper Management of Extramural Research Projects."

> This chapter concludes that heavy workloads and lack of travel resources lead project officers to inadequately monitor the performance of extramural research projects. The report faults EPA for its lack of attention to, and guidelines for the timing of site visits, and for not justifying to the Congress its need for additional travel resources. GAO recommends that we seek appropriations specifically earmarked for site visits. They also urge laboratory directors to place high priority on necessary site visits in their allocated travel funds.

EPA Comment

We agree that project officers' workloads and travel funds for site visits to their extramural projects should be improved, although relief for either is not wholly at the discretion of EPA management. In the past, we have consistently sought travel funds for this purpose; the Congress has acted to reduce EPA travel request by $2 million in FY'80 and the House has proposed a reduction of $250,000 for FY'81. In addition, it should be noted that OMB imposes both personnel and travel ceilings. We do not agree that we should seek separate travel appropriations for site visits. This action would split a resource that is already under continuous scrutiny.

Further, the GAO report is somewhat simplistic in attempting to develop a case that EPA laboratories "...might need to place higher priority on site visits - compared to other programs..." (p. 36). In comparing one laboratory's percent of travel funds used for site visits to another's, the report does not discriminate between the types of awards (percentage of funds allocated for grants, contracts or cooperative agreements) or the missions of the various laboratories. These variables significantly alter or dictate the necessity for site visits. GAO uses the Health Effects Research Laboratory (HERL) example on p.36 to note that: for example, whereas one laboratory used 54 percent of its fiscal year 1979 travel funds for trips by its personnel to attend and participate in meetings, seminars and conferences...it used at most only 10 percent of those funds for site visits." From this, the report concludes that "The preceding table indicates that closer scrutiny by laboratory managers of travel fund usage might permit more site visits." This conclusion is specious and unwarranted. It is based on a failure to analyze the reasons for this disparity. Also this statement implies that the use of travel funds for meetings, seminars and conferences, which is intended to keep our staff current in their respective disciplines, is not a good priority use. Again, without a discussion and analysis of the reasons for this travel, GAO's conclusion that it could be eliminated in favor of site visits is unwarranted.

Chapter 4, "Contract and Grant Awards need Improvement."

In this chapter, GAO found that the process of awarding contracts was slow, thus delaying research projects and that the research grant awards process was susceptible to bias and did not encourage competition.

Concerning contracts, GAO describes a poor EPA record in meeting standard acquisition leadtimes. GAO faults project officers for failing to prepare adequate procurement request packages on time and for failing to complete technical evaluations of proposals within established timeframes. Training for project officers has been available, but GAO claims that the course is too general and attendance could be improved.

Concerning grants, GAO notes that while delay in making awards has not been a problem, the procedures for soliciting grants appears to be closed to new researchers and does not encourage competition; that review procedures tend to inhibit competition and are susceptible to bias. GAO takes note of ORD's new grant solicitation procedures, agrees that they will help alleviate the above problems, but "cannot make a judgment until the new procedures are fully implemented."

GAO formally recommends that all project officers "take the course" and expedite their part of the procurement process.

EPA Comment

Concerning the contract project officer problems, we agree that both training and renewed emphasis on the necessity for timely evaluation of proposals would be highly desirable. We therefore concur with GAO's recommendations and intend to take necessary actions to make these changes.

Concerning the Grant solicitation problems, we have some serious concerns about the GAO presentation. The bulk of GAO's discussion describes past problems with the old grants solicitation procedure. This procedure was replaced by a peer-review panel system, which is in place for all FY'80 grants funding (about $18 million). Thus the discussion is misleading. We established the new system to correct discrepancies in grant awards noted by ORD's own Grant Procedures Review Group, the National Academy of Sciences study, and the SAB's Health Effects Research Review Group. The new procedures have been implemented and operational since December 1979.

Statistical information based on the new research grants program and the way it is changing the number of applicants follows:

Table 1 Applications Received by Agency (Grants, Cooperative Agreements, Demonstration Grants)

Period	FY 1979	FY 1980
10/01 06/30	645	1122
10/01 09/30	815	*

*Final results not yet available.

Table 1 shows an increase in total applications in the new grants program which reflects both our new solicitation process and our publicizing efforts. Of the 1122 applications received through June 30, 1980, 654 constitute research grant applications. Note that this exceeds the total applications for all assistance received in the same period of FY'79.

GAO note: We have revised the body of this report to address EPA's concerns about our presentation of problems with its previous grant solicitation and award procedures and its new procedures that have been used for all fiscal year 1980 grant funding activities. (See pp. 51-55.)

Table 2. Grants Actually Awarded - FY 1980

	Applications	Funded	Funds Expended	% Funded
1st peer review cycle	84	16	$1,866,000	19%
2nd peer review cycle	135	35	6,680,000	25%
3rd peer review cycle	435	*	*	*

*Final results not yet available.

Table 2 indicates the following:

(1) The sharp increase in applications received is a result of the solicitations we published.

(2) If the rate of funding which was achieved in the second cycle (25%) were to be repeated in the third cycle, we would fund 108 grants, bringing total grant awards to 159 and an award ratio of 4.1 to 1 or 24% funding.

Of the 51 funded applications thus far, only 17 -33.3% had previously received research grants from EPA. Therefore, 66.7% of our funding to date has been to investigators who are new to EPA.

Although the statistics presented here are for only a portion of our first fiscal year, they show clearly that the new program has accomplished two of its stated purposes: to increase competition by increasing the number of applications from which to select the awards and to encourage applications from investigators not previously awarded grants by EPA.

GAO contends that researchers with innovative ideas may have perceived the system to be so inbred as to have been discouraged from applying for grant assistance. However, our present experience does not support these comments, as the above tables reflect.

GAO also contends that "ORD's procedures for review and selection of grant proposals to be funded were susceptible to bias" (p. 48). While this has been a concern under the ad hoc system of review of proposals, the new review process includes the peer panel review of all grant proposals and an expanded, controlled process of ad hoc review of cooperative agreements. Under this new system, the reviewers' names are provided to ORD laboratories from pre-approved listings contained in a computer data base which the Office of Research Grants and Centers maintains. The opportunities for misuse of this system are minimal. Further, ORD laboratory directors are responsible for the resolution of issues raised by the project officer in a decision memorandum. This official provides the final check in the system to ensure that the review process is not biased and proposals are not preselected, as alleged in the GAO report.

Chapter 5, "Improvement Needed in the Evaluation of Extramural Research Performance"

This chapter faults EPA in evaluating the performance of contractors and grantees. GAO alleges that we usually do not follow procedures for evaluating contractors in a timely manner, and that the evaluations are seldom used in assessing contractors' qualifications for new awards. Further, GAO notes that we have no formal procedures for evaluating grantees performance, and technical evaluation is not made beyond the project officers' stage. GAO claims that reports necessary for closeout of completed projects are often late, which suggests a need for "formal business evaluations" of grantees' performances Although ORD's grant procedure review group suggested procedures for addressing these problems, GAO feels these procedures "may not provide adequate record" of grantees' performance.

GAO makes formal recommendations that EPA enforce the requirements for evaluating contracts, and use these requirements to access the qualifications of those seeking new awards. GAO further recommends that we establish similar procedures for evaluating grants and cooperative agreements. Finally, GAO recommend that supervisors and higher-level officials review these evaluations.

EPA Comment

Concerning contracts evaluations, we agree that more could be done to comply with present Agency procedures. This problem will be addressed by a planned contract management improvement task force.

Evaluating grantees' performance is not as clear cut, as GAO indicates. The Agency's Grants Administration Division is not staffed to perform an evaluative function on the 400 to 500 awards made annually and it has no responsibility to do so. More importantly, as GAO recognizes, grant projects address issues for which there is no set answer; project periods are based on hoped-for results; delays are frequent and are usually not the fault of the investigator. While ORD wants to take all steps necessary in the pursuit of highest quality research, we do not feel that grantee evaluations, under the conditions described above, are feasible. Further, those qualified to perform this research are generally well-known to the peer reviewers who are responsible for these areas and who help prevent awards to poor performers. These researchers attach resumes to their applications which gives peer reviewers sufficient knowledge of the researcher's past performance. Further, the academic community has its own sanctions. Research results published in peer-reviewed journals could be assumed to be worthwhile reflections of a researcher's creditability. We believe that this system of evaluation is sufficient.

GAO's suggestion to circulate lists of poor performers might cause legal problems. Maintenance of "black" or "gray" lists is illegal and is not formally done by other R&D agencies.

Concerning project closeouts, the ORD Grant Procedures Review Group (GPRG) draft report, whose findings GAO quotes, notes project closeout concerns, but also cautions that the statistics provided may have other meanings. In the case of final reports, the data is entered into the Grant Information Control System (GICS), which is the source of the data in the GPRG draft report. While many overdue final reports cause project closeout delays, other reports are in the hands of project officers, but are not entered into the GICS as accepted. The fact that the report is not recorded does not mean that the project results are not available or being used. Laboratory Directors and the Director, Office of Research Grants and Centers (ORGC) are responsible for obtaining the reports.

The Grants Administration Division currently provides project status information monthly to responsible decision officials. Late project reports are not viewed as a serious problem. Additionally, ORD has moved toward requiring project results disseminated through seminars and publication in peer reviewed journals as a better means of accomplishing its diffusion and dissemination roles. In addressing ORD's reporting requirements and policies, the GAO report should refer to ORD's new Technical Information and Policy Guide.

A further note: GAO does not distinguish between a "business" and a "technical" evaluation. We have assumed in our discussion that an evaluation would involve the quality of the science involved rather than the financial soundness of the grantee's institution.

We appreciate the opportunity to comment on the draft report.

Sincerely yours,

C. William Carter
William Drayton, Jr.
for Assistant Administrator for
Planning and Management

Enclosure

Typographical and other errors:

p. 21, para 2: "March 3, 1979" should be "March 3, 1980."
p. 11, Table, change "gaseous and inhalable particulate pollutants" to "gases and particles."

14, para 3: Identify the "5 senior officials," as the three senior officials who are identified in the preceding para.

p. 12, This table may leave the impression that ORD carries the preponderance of opinion. This is not true, ORD has actively sought formal representation from all of ORD's major components: the regulatory and enforcement program Offices, the regional offices, and the Agency's office of Planning and Management. The ORD membership on the Committees is large because ORD has many different laboratories working in each Committee's area of concern. ORD has made an effort to draw its laboratory scientists into the Committees in order to promote direct communication between our bench scientists and non-ORD Committee members. In most cases, the Committees resolve issues not by vote but through negotiation and consenus. In those few cases where Committees do vote, the votes are distributed equitably.

p.14, para. 2: Qualify the statement of the Director of the Drinking Water Criteria and Standards Division that"there have been instances where ORD had..." not consulted the program office "in the final technical planning of the projects undertaken," as being in the area of epidemiology studies, and that since then, ORD has taken steps to improve its epidemiology program.

MISSIONS OF ORD OFFICES AND LABORATORIES

RESPONSIBLE FOR EPA'S RESEARCH AND DEVELOPMENT PROGRAM

Office and laboratories under its direction	Mission
Office of Health Research: Health Effects Research Laboratory, Research Triangle Park, North Carolina Health Effects Research Laboratory, Cincinnati, Ohio	Predict, measure, and determine the significance of human exposure to pollutants in order to prevent or reduce adverse effects.
Office of Environmental Engineering and Technology: Industrial Environmental Research Laboratory, Research Triangle Park, North Carolina Industrial Environmental Research Laboratory, Cincinnati, Ohio Municipal Environmental Research Laboratory, Cincinnati, Ohio	Develop and demonstrate methods for control and management of operations with environmental impacts associated with the extraction, processing, conversion, and transportation of energy, minerals, and other resources and with industrial processing and manufacturing facilities. Analyze the environmental and socioeconomic impact of extraction, transportation, processing, conversion, and utilization of energy, minerals, and other resources. Improve drinking water supply and system operations. Develop and demonstrate methods for prevention or management of pollution discharge or waste disposal into the environment from public sector activities, including publicly-owned wastewater and solid waste facilities.

Office of Environmental Processes and Effects Research: Environmental Sciences Research Laboratory, Research Triangle Park, North Carolina Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma Environmental Research Laboratory, Athens, Georgia Environmental Research Laboratory, Corvallis, Oregon Environmental Research Laboratory, Duluth, Minnesota Environmental Research Laboratory, Narragansett, Rhode Island Environmental Research Laboratory, Gulf Breeze, Florida	Develop the scientific and technological methods and data necessary to understand, predict, and manage the entry, movement, and fate of pollutants into the environment and the food chain and their effects on nonhuman organisms and ecosystems.
Office of Monitoring and Technical Support: Environmental Monitoring and Support Laboratory, Research Triangle Park, North Carolina Environmental Monitoring and Support Laboratory, Cincinnati, Ohio Environmental Monitoring and Support Laboratory, Las Vegas, Nevada	Support EPA's program and regional offices by providing techniques, equipment, and systems for measuring and monitoring environmental pollutants and maintaining quality control of measurement and monitoring techniques.

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